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Infantry Training

Volume II

INFANTRY HEAVY WEAPONS

PAMPHLET No. 24

THE MEDIUM MACHINE GUN
PART I—MECHANICAL SUBJECTS

1951

(This pamphlet supersedes Small Arms Training, Volume I, Pamphlet No 7, Part 1, 1941 (Code No. 7226)

By Command of the Army Council.

G. W. Simms.

THE WAR OFFICE,
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AMENDMENTS

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2050—1

PLATE — LIST OF PLATES

ABBREVIATIONS

The following abbreviations are used in this pamphlet:—

DP ... Drill pattern.

IA ... Immediate action.

MMG Medium machine gun.

MPI... Mean point of impact.

OP ... Observation post.

RAP Regimental aid post.

RV ... Rendezvous.

QE ... Quadrant elevation.

GLOSSARY OF TERMS USED IN THIS PAMPHLET

Angle of sight

The angle between the line of sight and the horizontal plane. The angle is said to be plus when the target is above the horizontal plane and minus when the target is below it.

Crest clearance angle

The angle by which the barrel must be raised above the line of sight to the crest to ensure that all the bullets will clear the crest.

Deflection

A lateral displacement of the lines of any, or all, guns.

Direct fire

When the gun is laid directly on the target by means of the backsight and foresight.

Fixed line

A term denoting that measures have been taken for maintaining elevation and direction in darkness, etc, to ensure that fire will fall on the pre-arranged area of ground.

Flanking fire

Fire applied across the front of a locality occupied by own troops, or, if they are advancing, at an angle to their line of advance.

Ground angle

The angle between the line of sight to the target and the line of sight to own troops when using overhead fire.

Group commander

An officer or NCO commanding two or more machine gun sections.

Indirect fire

When a gun is laid to hit a given target by other means than by laying on it direct.

Line of fire

The direction of the target from the gun.

Minimum clearance

A term used to denote the minimum height of the centre bullet of the cone above the heads of our own troops for the latter to be safe.

Near limit of arc

The nearest line across the arc of fire on which fire may be required.

Overhead fire

Fire passing over the heads of our own troops.

Pivot gun

The gun used as a basis for calculation.

Quadrant angle

The angle which the axis of the barrel makes with the horizontal plane.

Quadrant elevation

The quadrant angle expressed in terms of a range and an angle of sight.

Registering

The recording of the direction and elevation necessary to hit any given target as found by ranging.

Safety angle for flanking fire

The minimum lateral angle by which fire must clear own troops for them to be safe.

Safety angle for overhead fire

The minimum angle which must be included between the axis of the barrel and the line of sight to own troops to ensure their safety under overhead fire.

Tangent angle

The angle which the axis of the barrel makes with the line of sight.

Zero line

A line of reference on which all guns are parallel and from which switches are measured.

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Infantry Training

VOLUME II

INFANTRY HEAVY WEAPONS

PAMPHLET No. 24

The Medium Machine Gun
Part I—Mechanical Subjects

INTRODUCTION

Scope of the pamphlet

1. This pamphlet contains material which will enable the officer or NCO instructor to train the soldier in the technical handling of the machine gun, both as an individual and as a member of a direct or indirect fire unit. The pamphlet also contains the material required to teach the officer or NCO the principles and practice of machine gun fire control.

The detailed battle procedure of the machine gun is contained in Chapter 15. The basic tactical handling of the platoon is contained in Infantry Training, Volume IV.—Tactics, The Infantry Battalion in Battle.

Layout of the pamphlet

2. The pamphlet is divided into three parts:—

Part I.—Mechanical Subjects.—This part contains the whole of the mechanical aspect of the Vickers machine gun. It also contains the lessons dealing with the various instruments that are used with the machine gun. As far as possible, the lessons are arranged in the order in which they should be taught. The lessons of Chapter 8 can, however, be interposed among the lessons of the previous chapters.

Part II.—Drills and Training.—This part is designed to teach the soldier the whole of the handling of the weapon. Starting from individual handling, it takes the soldier progressively through his duties as a member of a gun team in gun drill and advanced machine gun handling to his duties as a member of a Section in direct fire and of a Group in indirect fire. The lessons in this part should be taught together with the lessons in Part I.

Part III.—Fire Control.—This part should only be taught to officers and NCOs or potential NCOs. It covers the whole of the fire control required for the machine gun. The lessons are generally in the order in which they should be taught, but Lessons 102 and 103 and the lessons in Chapter 19 should be taught after Chapter 17. Lesson 104 should be taught after Chapter 21.

3. Each lesson is divided into two parts. Part A,—Instructors' Notes contains the information required by the instructor to enable him to prepare for the lesson. Part B,—Conduct of Lesson gives the matter to be taught in what has been found to be the best sequence.

Organization of MMGs in the Infantry Battalion

4.

MACHINE GUN PLATOON ORGANIZATION

ESTABLISHMENT

Pl HQ

Captain		LMG
Dvr op	Carrier	31 set (Forward link)
Dvr op		31 set (Rear link)
Dvr		88 set
Subaltern	Car 5-cwt (Jeep) and trailer	31 set
Dvr op		88 set
Batman/dvr		
Pl sgt	MC	
Storeman	15-cwt and trailer	
Dvr		
Veh mech, REME		
Motor cycle orderly MC		

No. 1 MMG Section		**No. 2 MMG sect**	**No. 3 MMG sect**	**No. 4 Wasp section**	
Sgt	LMG, PIAT	As for No. 1 Sect	As for No. 1 Sect	Sgt	Carrier
Dvr op	31 set,			Dvr	Wasp, LMG
Dvr	88 set,			Dvr op	31 set, 88 set
1 pte (rangetaker)	Carrier				
Cpl	Carrier	Cpl		Cpl	Carrier
Dvr	MMG	Dvr		Dvr	Wasp
2 ptes		2 ptes		1 pte	LMG

TOTAL PLATOON
2 officers, 55 other ranks

Organization of training in technical handling

5. The table shown overleaf gives the subjects which must be taught in preliminary training. As a guide for organizing such training, the course is shown divided into four stages. A suggested number of periods for each lesson or group of lessons is also given.

A suggested course in fire control, designed for junior officers and NCOs, with an allotment of periods to cover about three weeks is set out over-leaf.

Safety precautions

6. On all occasions when the gun and drill cartridges are used for instructional purposes, the instructor will carry out the following safety precautions:—

(a) Inspect all locks to ensure that the striker does not protrude through the firing pin hole.

(b) Inspect all ammunition to ensure that all cartridges are drill.

7. When service stores are used, *(a)* above does not apply.

8. Whenever possible as many pieces of equipment as are available should be used to ensure maximum squad practice.

PRELIMINARY TRAINING
MACHINE GUN COURSE

Subject	1st stage		2nd stage		3rd stage		4th stage	
	Lessons	Periods	Lessons	Periods	Lessons	Periods	Lessons	Periods
The gun and tripod ...	Lesson 1 & 2	3	—	—	—	—	—	—
Stripping	Lesson 3-6	5	Lesson 7, 8	3	—	—	—	—
General maintenance	Lesson 9-15	9	—	—	—	—	—	—
Spare parts and repairs	Lesson 17	2	—	—	—	—	—	—
Immediate action ...	—	—	Lesson 19-22	11	Lesson 23	2	Lesson 18	1
Mechanism	—	—	—	—	Lesson 24-29	10	Revision	5
Causes of stoppages ...	—	—	—	—	—	—	—	—
Instruments and aiming	Lesson 35	2	Lesson 36-42	11	Revision	3	Lesson 30-34	6
Gun drill	Lesson 48-55	15	Lesson 56-59	11	—	—	—	—
Advanced machine gun handling ...	—	—	—	—	Lesson 61-65	10	Lesson 60 (TOET)	6
Visual training ...	—	—	—	—	—	—	—	—
Section drill ...	—	—	—	—	Lesson 68-74	12	Lesson 66-67	3
Indirect fire drill ...	—	—	—	—	—	—	—	—
Part I MMG course ...	Practices 1-3	3	Practice 4	3	Practice 5	2	Lesson 75-82	16
Part II MMG course...	—	—	—	—	—	—	—	—
	Total	39	Total	39	Total	39	Total	39

CHAPTER 1.—THE GUN AND TRIPOD

LESSON 1.—GENERAL DESCRIPTION

A INSTRUCTOR'S NOTES

Aim

1. To introduce the weapon to the soldier and to give him a general idea of how it works.

Class and instructors

2. Squads under squad instructors. Squad seated in a semi-circle on right side of gun.

Periods

3. One 45-minute period.

Stores

4. Gun, tripod, ammunition liner, belt with drill cartridges, spare parts case, condenser can and tube, gun chest, spare barrel, cleaning rod and blast deflector.

5. Skeleton gun and wall diagrams are of value if obtainable.

Preparation

6. Gun mounted, and all accessories laid out in their correct place. If two guns are available, one should be stripped and the recoiling portions assembled on a table, the gun casing being fitted into the gun chest. Paras 13 and 14 will then not apply.

B CONDUCT OF LESSON

Approach

7. Give the aim of the lesson (para 1 above).

8. Explain that during the lesson the main parts of the gun and their names will be pointed out, but that it is not expected that they should be remembered in this first lesson.

The gun

9. Name.—.303-inch Vickers medium machine gun.

10. Weight.—40 lb (with water in barrel casing).

11. Rate of fire.—about 500 rounds *per* minute.

Forces which work the gun

12. Describe how the gun is worked by two opposing forces:—

(a) The explosion of the charge in the round which drives the recoiling portions *back*, and

(b) The fusee spring, which forces the recoiling portions *forward* again.

Parts affected by recoil

13. Strip the gun to show the parts affected by the recoil. Show how they fit together by assembling them on a table. Emphasize the strength of all parts. The parts affected by the recoil are:—

Muzzle cup.	Barrel	Right and Left side plates.
Crank and crank handle.		Fusee and spring.
Connecting rod.	Lock.	Parts of the feed-block.

14. Reassemble the gun before continuing the lesson.

The barrel casing

15. Describe the outside of the barrel casing, pointing out the following parts:—

Muzzle attachment. Blast deflector. Screwed plugs for filling and emptying. Adaptor for condenser tube and cork plug. Foresight.

Water-cooling system

16. Explain that inside the barrel casing are the barrel and steam tubes. Use the diagrams and skeleton gun to show these to the squad.

17. Point out that the barrel is surrounded by water to keep it cool. Explain that the firing of the gun will heat the barrel which in turn heats the water and after firing about 500 rounds rapid the water will boil and give off steam.

18. Describe how the steam escapes from the barrel casing by means of the front or the rear hole in the steam tube depending on the position of the sliding valve. Show, using diagrams or a skeleton gun how, when the gun is fired with elevation, the valve covers the rear hole and allows the steam to escape through the front hole. Similarly when the gun is fired with depression the valve covers the front hole and steam can escape through the rear hole.

19. Describe how the steam is carried from the steam tube, through the steam escape tube and then through the condenser tube into the condenser can. Explain that in order to condense the steam into water again, the can must be about two thirds full of water and the end of the condenser tube below the level of the water. If the end of the condenser tube is above the level of the water, the steam will escape into the air and water will thus be lost.

Breech casing

20. Point out the following parts of the breech casing:—

Outside plates.	Bottom plate.
Front and rear covers.	Rear crosspiece.
Left side of casing:—	Front cover catch, fusee spring and box.
	Dial sight bracket. Left slide.
Right side of casing:—	Check lever.
	Right slide, collar and roller.
Rear cover:—	Tangent sight.
Bottom plate:—	Sliding shutter.
Rear crosspiece:—	Traversing handles. Safety catch.
	Thumb-piece. Firing lever.

Show how the rear crosspiece is held in position by the fixing pin.

Feed

21. Explain that the gun is fed by a belt containing 250 rounds which passes through the feed-block from right to left.

Tripod

22. Point out and name the parts of the tripod:—

Legs and jamming handles.	Cross-head and pivot.
Socket.	Traversing clamp.
Direction dial.	Elevating gear.

23. Demonstrate clamping up of the legs.

24. Show method of fixing the gun to the tripod by the cross-head and elevating joint pins.

25. Demonstrate that the gun is elevated or depressed by the elevating gear and that the traversing clamp, when tightened, controls the traverse of the gun. Demonstrate that by loosening the traversing clamp fully the crosshead can be removed from the socket. Show the pivot.

The weight of the tripod is about 50 lb.

Gun chest

26. Tell the squad that in transit, the gun is placed in the gun chest. Show how this is done and how the cleaning rod and spare barrel fit in the chest. When the gun is in the chest, the blast deflector is usually put on the strap of the spare parts case.

Conclusion

27. Demonstrate and explain the correct sitting position behind the gun, knees bent and out, heels together, elbows resting inside the thighs, first fingers over the top of the traversing handles, second fingers under the safety catch and third and little fingers around the base of the traversing handles. The thumbs resting lightly on the thumb-piece and the firer looking to the front. Demonstrate loading, firing and unloading. Explain that the squad will be taught these actions later, and that they are only being shown for interest sake.

28. Questions to and from the squad. Don't expect the squad to remember the names of all parts. In answering questions the instructor should be careful not to get involved in the subject matter of subsequent lessons.

29. Sum up the main points.

LESSON 2.—CHARACTERISTICS

A INSTRUCTOR'S NOTES

Aim

1. To teach the class the capabilities and the limitations of the MMG.

Class and instructors

2. Class under an officer. Squad instructors will be required at the conclusion of the lesson to coach their squads in firing practice 1, Part 1, MMG course.

Periods

3. One 45-minute period for lecture.
One 45-minute period for demonstration.
The time required for firing the range practice depends on the size of 30-yards range available and the number of guns that can be fired simultaneously. Five minutes *per* man *per* gun can be taken as a guide.

Stores

4. *For lecture.*—Gun, tripod, dial sight, condenser can and tube, blast deflector belt and liner, range-finder, director and stand.

5. *For demonstration.*—Service gun and tripod and one spare in case of major breakdown. Spare parts case and box. DP tripod. White screen and 3 wooden plates. Dry ashes and wet sack.

6. *For Practice* 1.—As many service guns, complete with stores, as the size of the range permits. 50 rounds SAA *per* man—spaced in two groups of 25 rounds.

Preparation and rehearsal

7. Two instructors will be required to give the demonstration. The supervising officer should rehearse the demonstration with them beforehand.

8. Service guns must be carefully prepared and all belts should be inspected.

B CONDUCT OF LESSON

Approach

9. State the aim of the lesson (*see* para 1 above) emphasizing that unless machine-gunners know what the gun can do and what it cannot do, it will not be employed in the most efficient way.

Concentrated fire

10. Explain that the first characteristic of the gun is its ability to produce concentrated fire—it can put a number of bullets into a small space. This is due to its fixed mounting and close grouping.

Volume of fire

11. Explain that the high volume of fire is due to the belt feed, and that the volume is controlled by the length of burst and the rate of fire. A burst is always 25 rounds.

Rates of fire

12. *Normal.*—Pause of 8 seconds between bursts.
Rapid.—Pause of 2 seconds between bursts.

Accurate fire

13. State that the great accuracy of the gun is due to the fixed mounting and to the use of instruments, *eg*, the range-finder.

14. Tell the squad that accuracy can be maintained in darkness, fog or smoke by means of special instruments.

15. Due to its accuracy and to the instruments provided, the gun is able to fire:—

(a) Over the heads of the infantry.
(b) Indirect (explain briefly what this means).
(c) Blinded by smoke or fog.
(d) By night, if daylight preparations have been made.

Sustained fire

16. Explain that the gun can maintain the high volume of fire for long periods due to its strong mechanism, belt feeding and water cooling.

Long range

17. The maximum range of the gun is 4,500 yards, but it is not normally required to fire over 2,000 yards. It can engage targets well beyond the reach of other low trajectory weapons.

Flexibility

18. Having 360 degrees traverse, the gun can engage targets in rapid succession over a wide area. Emphasize that flexibility depends to a large extent on good indication and recognition of targets.

Mobility

19. State that the gun and its team are carried in a tracked carrier giving a good cross-country performance, and some armoured protection against small arms fire.
Under certain circumstances, the gun can be fired from the carrier.

Limitations

20. Describe the limitations of the gun and the means of remedying or minimizing them as given below:—

(a) Mechanical breakdown—good maintenance and handling.
(b) The following points may enable the enemy to detect the position of a machine gun:—
Steam—use of condenser can.
Smoke—avoid excessive oil.
Muzzle-blast—use of blast deflector and wet sandbags, etc.
Flash—screen from flanks.
(c) Weight of the gun and tripod is a limitation as regards manhandling.

Demonstration of characteristics

21. Throughout the demonstration the supervising officer should give a commentary on the main lessons to be learned. He should use the demonstration to drive home the points he has made in his lecture.

22. Sequence of the demonstration and notes on its conduct are given below:—

Demonstrate:—	*Method:—*	*Points to emphasize:—*
1. Service burst.	Fired at stop-butt. Belt spaced.	Importance of service burst and time to fire.
2. Rates of fire.		
(a) Normal.	Belt not spaced. Fired at stop-butt.	Time for maintenance between bursts.
(b) Rapid.	Belt not spaced. Fired at stop-butt.	Time only for quick check of aim between bursts.
3. Volume and accuracy.	100 rounds straight at white screen.	Size of group and volume of fire.
4. Factors affecting accuracy.		
(a) Tripod not stamped in.	100 rounds at screen.	Compare size of group in each case.
(b) Tripod stamped in.	100 rounds at screen.	
(c) Loose jamming bolt.	Prepare tripod by loosening jamming bolt and tumbler nut. 50 rounds straight at screen.	
(d) Punch fired.	50 rounds straight at screen.	Emphasize that human element does not affect accuracy.
(e) Recruit fired.	50 rounds straight at screen. Gun to be laid and loaded by instructor.	
5. Flexibility.		
(a) Rapid engagement of targets.	3 coloured plates on stop-butts, sufficiently spaced to necessitate the use of the clamp in one switch.	Speed with which targets can be engaged.
(b) Swinging traverse.	1 belt along stop-butts. Condenser tube to be removed from can to show amount of steam given off.	Used in an emergency only. Rate of traverse 1 yd in 2 secs at 25 yds.
6. Muzzle blast.		
(a) Ashes down, blast deflector off.	2 spaced bursts.	Compare amount of dust caused by blast.
(b) Wet sacks down.	2 spaced bursts.	
(c) Blast deflector, no wet sacks.	2 spaced bursts.	

23. Each man should now fire Practice 1, Part I of MMG course.

Conclusion

24. Questions from the class.

25. Sum up capabilities and limitations.

CHAPTER 2.—STRIPPING

Aim

1. The aim of all stripping lessons is to teach the men the correct method of stripping the gun and its parts, so that they can maintain the gun and replace breakages as quickly as possible. The man is taught to strip the gun in a certain sequence.

This sequence should normally be adhered to, as it is devised to ensure that the gun or its parts are stripped rapidly and without damage.

Competitions and tests

2. In all stripping competitions and tests, DP stores must be used. Precautions will be taken to avoid damage to the gun by careless handling.

LESSON 3.—GENERAL POINTS

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated in a semi-circle facing the instructor.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, spare parts case and box and as many locks as are available.

Preparation

4. All tools removed from the case and the box and laid out on a table, the gun mounted in such a position that all the squad can see it.

B CONDUCT OF LESSON

Revision

5. Revise on the names of a few main parts as taught in Lesson 1.

Approach

6. State the aim of all stripping lessons.

7. Tell the squad that before learning how to strip the gun, there are certain general points which must be known to avoid damage to the gun.

Use of correct tool

8. Explain and demonstrate the use of the correct tool for the job, *eg*, screwdrivers according to the size of screw and correct punches, according to the type and size of pin to be removed.

Point out that if this rule is not observed, screws and pins will get burred and the assistance of an armourer will be required to remove them.

Screwed axis pins

9. Tell the squad and demonstrate that when removing screwed axis pins, the threads must be fully unscrewed or they will be damaged.

10. Point out and demonstrate that when replacing screwed axis pins, the threads must be engaged without the use of force to avoid cross-threading.

Front and rear covers

11. Explain and demonstrate that before closing the front cover, the feed-block must be in position and the front cover catch raised, otherwise damage may occur to the front cover.

12. Explain and demonstrate that when raising the rear cover, it must be lifted under control. If it is thrown back, the hinge may be damaged. When the rear cover is lowered, the lock must be correctly placed in the gun.

Securing chains

13. Point out that parts secured by chains, *eg*, outer casing split pin, cork plug, must not be removed by pulling on the chains; otherwise the chains may be broken and a vital part lost.

Use of hammer

14. Demonstrate the use and misuse of the hammer. Explain that direct hammer blows must not fall on the gun. Wood must always be placed over the part which requires a hammer blow.

Firing the lock

15. Explain that the firing pin must never be released unless the extractor is up against the extractor stop, or the striker may be broken.

16. State that the lock must be fired when it is in or out of the gun, except when the gun is loaded, to release tension on the lock spring.

17. Demonstrate, and practise the squad in firing and cocking the lock. To fire the lock, the extractor must be fully raised all the time, and the tail of the sear depressed by pressing down the side levers head, until a click is heard. The tail of the trigger is then pushed to the rear and the firing pin will go forward.

To cock the lock, force the side levers head right up as far as possible, when the firing pin will be held to the rear.

Conclusion

18. Questions to and from the class.

19. Sum up main points and emphasize that with reasonable care defects and breakages in machine guns are of rare occurrence. They are mainly due to neglect of ordinary precautions

LESSON 4.—STRIPPING THE GUN

A INSTRUCTOR'S NOTES

Class and instructors

1. Squad under squad instructors. Squad seated in a semi-circle around gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod and spare parts case.

Preparation

4. The necessary tools should be removed from the case and the gun mounted.

B CONDUCT OF LESSON

Revision

5. Revise on points of stripping (*see* Lesson 3).

Removing the lock

6. Explain and demonstrate that the gun is unloaded, the crank handle pulled back on to the roller and the rear cover raised. The thumb or first finger of the left hand is placed between the extractor and stop, and the right thumb on the milled base of the connecting rod. The crank handle is allowed to move slightly forward so that the lock can be lifted clear of the side plates and breech casing. The lock can then be turned slightly and removed from the connecting rod.

When the lock has been removed, the crank handle is allowed to move forward under control on to the check lever. While this is taking place, the right thumb, by bearing on the milled base of the connecting rod, prevents the connecting rod from fouling the bottom of the breech casing.

The rear cover is then closed, and the lock fired.

Muzzle attachment

7. Explain and demonstrate that the split pin is withdrawn and the blast deflector removed. The outer casing can now be turned and removed. Finally the muzzle cup is unscrewed by means of the combination tool and removed.

Feed block

8. Raise the front cover, lift out the feed block, and close the cover.

Fusee spring and fusee

9. Describe and demonstrate that with the right hand at the rear of the fusee box and the left hand at the front, the box is pressed forward until it is clear of the studs and then removed; the spring is then disconnected from the fusee chain.

10. The fusee is turned to the rear, until the lugs on the stem are free, and then withdrawn.

Recoiling portions

11. Explain and demonstrate that the rear cover is raised, the T fixing pin is unscrewed and the rear cross-piece lowered. The right and left slides are then removed and the barrel and side plates withdrawn. The side plates are then disconnected, the left one first.

12. With the gun stripped, complete the description of the parts.

Assembling the gun

13. Describe and demonstrate assembling the gun. All that this in fact entails is reversing the operations of stripping the gun.

14. Ensure that when assembling the barrel and side plates, the radial groove is uppermost and that no force is used. If the side plates are not home on the barrel trunnions and crank shaft, the barrel must not be placed in the gun, otherwise burrs on the crank shaft may occur.

Practice

15. Practise the squad in stripping and assembling the gun individually, the rest of the squad watching for errors.

In order to make sure that the squad learn the names of the parts, it is advisable to make them name all parts as they are handled.

16. Initially it is desirable to make the men place the parts in order as they remove them, but later as they become more practised the instructor should mix them up and require the squad to select the correct parts themselves when assembling the gun.

Conclusion

17. Questions from the class.

18. Further practice for backward men.

19. If time allows, small competitions are of value.

20. Sum up sequence of stripping and assembling.

LESSON 5.—STRIPPING THE LOCK

A INSTRUCTOR'S NOTES

Class and instructors

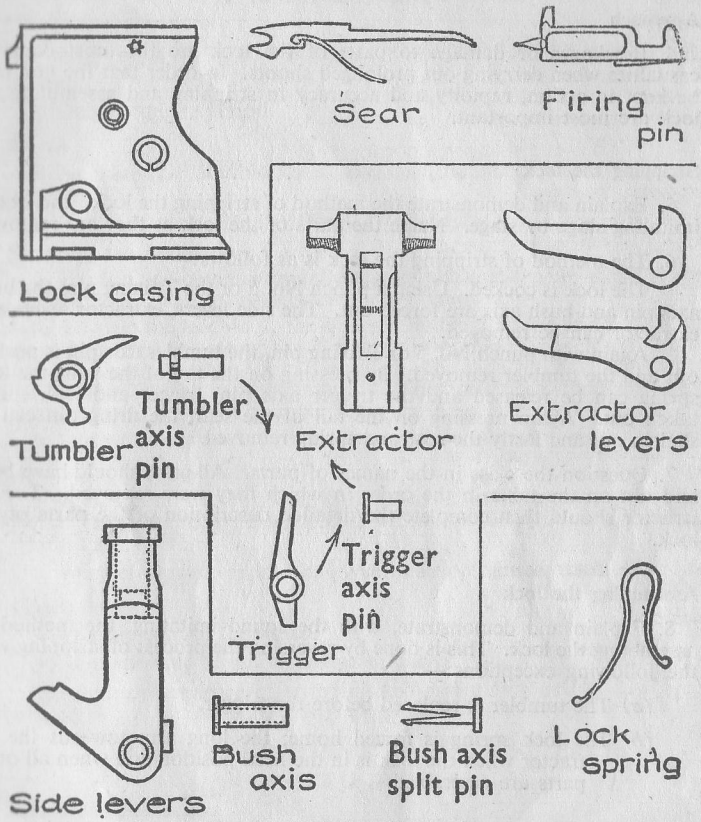
1. Squads under squad instructors. Squad seated around the table.

Periods

2. One 45-minute period.

Stores

3. As many locks as available together with punches No. 5 or T fixing pins.



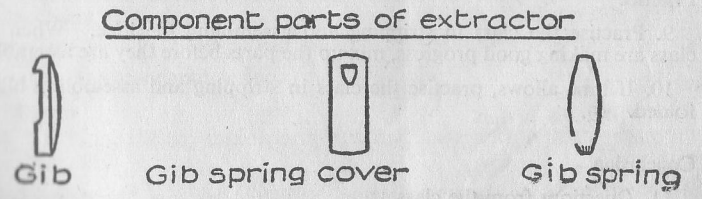


PLATE 2.—Components of lock

B CONDUCT OF LESSON

Approach

4. Breakages or damage to parts of the lock are the most common casualties when carrying out prolonged shoots. In order that the gun may be kept in action, rapidity and accuracy in stripping and assembling the lock are most important.

Stripping the lock

5. Explain and demonstrate the method of stripping the lock, the squad imitating stage by stage. Name the parts of the lock as they are removed.

6. The method of stripping the lock is as follows:—

The lock is cocked. Using a punch No. 5 or the T fixing pin, the bush axis pin and bush axis are forced out. The side levers, extractor levers and extractor can be removed.

Again with punch No. 5 or T fixing pin, the tumbler axis pin is pushed out and the tumbler removed. By pressing on the tail of the sear, the lock spring can be released and the trigger axis pin, trigger and lock spring taken out. Again pressing on the tail of the sear, the firing pin can be shaken out and lastly the sear and spring removed.

7. Question the class in the names of parts. All parts should have been laid out on the table in the order in which they were removed. The instructor should then complete the detailed description of the parts of the lock.

Assembling the lock

8. Explain and demonstrate, with the squad imitating, the method of assembling the lock. This is done by reversing the process of stripping with the following exceptions:—

(a) The tumbler is replaced before the trigger.

(b) The lock spring is forced home, the long arm towards the extractor when the lock is in the fired position and when all other parts are assembled.

Practice

9. Practise the class in stripping and assembling the lock. When the class are making good progress, mix up the parts before they are assembled.

10. If time allows, practise the class in stripping and assembling blindfolded.

Conclusion

11. Questions from the class.

12. Discuss progress made.

LESSON 6.—STRIPPING THE FEEDBLOCK

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated around a table.

Periods

2. One 45-minute period.

Stores

3. As many DP feedblocks as available, hammer, pliers, T fixing pin, punches No. 5.

B CONDUCT OF LESSON

Stripping the feedblock

4. Explain and demonstrate, the squad imitating stage by stage, stripping the feedblock. Name the parts as they are removed.

5. To strip the feedblock, the split pin holding the top and bottom levers must be forced out using the T fixing pin or No. 5 punch and hammer, and the top and bottom levers separated. The slide will now come out and the pawl and spring can be removed. The bottom pawl axis pin must be extracted with the pliers and the spring and pawls taken off.

6. With the feedblock stripped, complete the description of the parts.

Assembling the feedblock

7. Explain and demonstrate, with the squad imitating stage by stage, the method of assembling the feedblock, which is merely to reverse the above operations.

8. Further practice should be given in stripping and assembling.

Conclusion

9. Questions from the squad.

10. Questions to squad on names of parts.

11. Sum up sequence of stripping and assembling and discuss progress made.

LESSON 7.—STRIPPING COMPONENT PARTS

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated around the gun in a semi-circle.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, spare parts box and case and as many extractors as available.

Preparation

4. The necessary tools should be laid out on a table.

B CONDUCT OF LESSON

Revision

5. Get two members of the squad to strip the gun and lock and lay the parts on the table. Question the remainder of the squad on the names of the parts handled.

Approach

6. This lesson deals with the stripping and assembling of a number of small parts which may on occasion have to be stripped for cleaning and replacement.

Stripping component parts

7. Explain and demonstrate the method of stripping and assembling the parts given below. Practise the squad after each stage.

(a) *Front cone.*—The front cone is unscrewed by means of the combination tool.

(b) *Packing gland.*—The packing gland is unscrewed by means of the combination tool. When assembling, the gland must be screwed fully home.

(c) *Front cover catch.*—The plug must be pushed inwards and given a quarter turn with a screwdriver. If pressure is released, the spring will force the plug out. Before the plunger is removed, it must be turned so that the slides are free to pass the lugs in the catch.

(d) *Extractor.*—If the gib spring cover is pushed out with a punch, the spring and gib can be removed.

(e) *Tangent sight.*—The axis pin must be unscrewed and removed. The tangent sight, piston and spring can then be taken off.

(f) *Rear cover lock.*—The axis pin must be unscrewed and removed. The rear cover lock can be lifted off and the spring pushed out with a punch.

(g) *Trigger bar.*—When the rear cover lock is off, the trigger bar spring can be removed.

(h) *Roller.*—The split pin is removed with pliers and the collar and roller will then slip off.

(j) *Sliding shutter.*—The catch must be depressed and the shutter moved to the front until it is up against the stop.

If the plunger is then pushed in with a No. 3 punch, and the catch pushed in, the shutter can be moved forward until it is clear of the breech casing.

8. Practise the squad in stripping and assembling all component parts.

Conclusion

9. Questions from the class.

10. Questions to the class on names of parts.

11. Discuss progress made.

LESSON 8.—CHANGING THE BARREL WITHOUT DRAINING THE BARREL CASING

A INSTRUCTOR'S NOTES

Aim

1. To impress upon the squad the importance of conserving the water supply at the gun.

2. To teach the method of changing the barrel without draining the barrel casing.

Class and instructors

3. Squads under squad instructors. Squad seated in a semi-circle around the gun.

Periods

4. One 45-minute period.

Stores

5. Gun, tripod, spare parts case and cloth for making plug. If available, two guns are of value to ensure maximum practice.

Preparation

6. The barrel must be packed and the barrel casings filled with water.

B CONDUCT OF LESSON

Revision

7. Question the class on the water cooling system (*see* Lesson 1).

Approach

8. The necessity for saving water depends entirely on the prevailing conditions. In tropical countries water is often very scarce. Under active service conditions getting more water may often endanger a man's life or give away the gun position. On active service, therefore, every care should be taken to conserve the supply of water with the gun.

9. After firing a number of rounds, the barrel may become worn and require changing. In barracks or billets, where a supply of water is available this merely entails draining the barrel casing, changing the barrel and refilling the casing.

10. Should, however, the barrel require changing during a shoot, a more rapid method and one less wasteful of water has been devised.

Changing the barrel without draining the barrel casing

11. Tell the squad that the normal sequence of stripping is followed until the slides have been removed. It should be noted that most parts would normally be hot and the instructor should not allow the muzzle attachment or the barrel, for example, to be handled with bare hands.

12. Detail two men as Nos. 1 and 2 and get the gun stripped down as in para 11.

13. The next stage is to remove the elevating joint pin, depress the gun and replace the elevating joint pin in the gun bracket.

14. Teach the duties of No. 2, who must prepare a plug for stopping-up the front end of the barrel casing by wrapping a piece of cloth around the end of a clearing plug or other suitable inplement. Explain that the No. 2 must insert the plug in the muzzle of the barrel and, as the recoiling portions are withdrawn, follow the barrel with the plug in order to close the hole at the front end of the barrel casing.

15. Explain the duties of No. 1. The No. 1, when the No. 2 is ready, withdraws the recoiling portions, lifts the barrel clear of the breech casing and by opening the side plates, allows the old barrel to drop clear.

16. Explain that to place the new barrel in the gun is merely the reverse of the above operations. Emphasize that the No. 1 must be careful not to damage the front packing when replacing the barrel and that the No. 2 must not remove the plug until it is pushed clear by the end of the barrel.

The gun must not be levelled until the barrel and sideplates have been replaced or water may leak out of the rear end of the barrel casing.

17. Nos. 1 and 2 should now complete the reassembling of the gun.

18. Practise the squad in pairs in changing the barrel.

Conclusion

19. Questions from the class.

20. Sum up main points and progress made.

CHAPTER 3

GENERAL MAINTENANCE OF THE GUN AND TRIPOD

THE MACHINE GUNNER'S MOTTO:—

"The more you do before you have to do it, the less you have to do when you have to do it."

LESSON 9.—CLEANING

A INSTRUCTOR'S NOTES

Aim

1. To teach the method of cleaning the gun and tripod.

Class and instructors

2. Squads under squad instructors. Squads seated in a semi-circle around the gun.

Periods

3. One 45-minute period. This lesson may well be taught in the first period allotted to cleaning stores.

Stores

4. Gun, tripod, spare parts box and case, condenser can and tube, cleaning rod, flannelette and cleaning material.

Preparation

5. Gun and tripod mounted, with the rest of the kit laid out on a table.

B CONDUCT OF LESSON

Approach

6. Tell the squad the aim of the lesson (*see* para 1).

7. For the gun to function satisfactorily under all conditions, its maintenance is of the first importance. The degree of cleaning carried out depends on the employment of the gun. In barracks, when the guns are probably not in use daily, the amount of cleaning need not be more than an occasional oiling. On active service, however, conditions will decide how often the gun is cleaned.

Cleaning

8. When guns are not continually in use, cleaning will consist of wiping over the outside of the gun and tripod, and all parts of the mechanism that can be reached without stripping, with an oily rag, and the inside of the barrel oiled. If the gun has been fired and then returned to store, the barrel will need cleaning daily for several days. For this the cleaning rod or double pullthrough can be used.

9. Explain, with the squad practising, that the gun will be stripped, and a piece of flannelette (4 × 2) placed in the eye of the cleaning rod and the rod pushed through the barrel several times. The muzzle protector will always be on the barrel when it is cleaned. This process will be repeated with fresh pieces of flannelette until the bore is cleaned. Then a piece of flannelette (4 × 1½) will be oiled and pushed through the barrel.

10. If the barrel cannot be cleaned with flannelette alone, the double pullthrough and gauze will be used. Before using the pullthrough, examine it to see the weight is not bent, the cord is in good condition, the gauze is oiled and the muzzle protector is on the barrel.

Thread the pullthrough through the barrel from the breech end, and with one man holding the barrel behind his back and underneath his armpits, and with one man on either end of the pullthrough, it will be pulled backwards and forwards through the barrel, the cord being kept taut to prevent wear on the breech. After using the double pullthrough, the barrel is cleaned with the cleaning rod and flannelette and re-oiled.

11. Another method of cleaning the barrel is with boiling water. The procedure is the same as for the rifle. Ensure that the squad know this method.

12. Practise the squad using the double pullthrough.

13. Periodically the gun should be completely stripped down, and all parts left clean and dry for inspection. If on inspection any part of the gun and tripod is found to be rusted, the rust will be removed by using flannelette soaked in paraffin. After cleaning off the rust all traces of paraffin must be removed and the parts well oiled. After inspection all parts should be oiled and reassembled.

14. Spare parts and remaining gun stores should also be examined and checked for damage, cleanliness and deficiencies.

Conclusion

15. Questions from and to the squad.

16. Sum up main points.

LESSON 10.—EXAMINATIONS, TESTS AND ADJUSTMENTS (1)

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier how to examine and test parts of the gun to see that they are in working order and if necessary to carry out certain adjustments.

Class and instructors

2. Squads under squad instructors. Squad seated in a semi-circle around the gun.

Periods

3. One 45-minute period.

Stores

4. Gun, tripod, spare parts box and case.

Preparation

5. Gun and tripod mounted with the rest of the stores laid out on a table.

B CONDUCT OF LESSON

Approach

6. Tell the squad the aim of the lesson (*see* para 1).

Examinations and tests

7. Describe the points to look for in examining and testing the following parts:—

(a) Muzzle attachment.—Should be free from fouling or burrs, the disc clean, and the split pin and chain in good condition. The blast deflector should be fitted correctly.

(b) Muzzle cup.—Should be clean and the threads neither damaged nor worn.

(c) Steam tube.—The keeper screw should be in its correct position and the sliding valve working. This can be tested by rocking the gun.

(d) Foresight.—The blade should be in good condition.

(e) Front cover catch.—Should be in working order.

(f) Fusee spring and fusee.—These should be in good condition. The vice pin should not be bent.

(g) Tangent sight.—The apertures should be undamaged, the top and bottom screws secure and the slide moving freely.

(h) Rear cover catch.—Test the automatic fastening of the rear cover when closed and that the rear cover lock screwed axis pin is tight.

(j) Safety catch.—Test the automatic action of the spring.

Weighing and adjusting the fusee spring

8. Explain and demonstrate the method of weighing the fusee spring. The lock should be removed and the loop of the spring balance placed over the knob of the crank handle. The balance should then be pulled vertically upwards. The reading indicated when the crank handle begins to move will be the weight or tension of the fusee spring. The mean of three readings should be taken and the weight should be between seven and nine pounds.

9. If the spring is over or under weight, the weight can be adjusted by the vice pin. Generally, six clicks or three complete revolutions of the vice pin make a difference of about one pound. Turning the vice pin upwards decreases the weight and downwards increases the weight.

10. State that the tension of the fusee spring should always be kept as high as possible during firing, consistent with maintaining a rate of fire of about 500 rounds per minute.

11. Practise the squad in weighing and adjusting the fusee spring.

Conclusion

12. Questions from the class.

13. Questions to the class on examinations and tests, and further practice if necessary in weighing the fusee spring.

14. Sum up main points and progress made.

LESSON 11.—EXAMINATIONS, TESTS AND ADJUSTMENTS (2)

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squads seated in a semi-circle around the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, spare parts case, drill cartridges, wall diagrams and a pointer.

Preparation

4. Gun mounted with the remaining stores laid on a table.

B CONDUCT OF LESSON

Approach

5. Repeat aim of Lesson 10. This lesson deals with another series of examinations and tests.

Examinations and tests

6. Describe the method of examining and testing the following parts:—

(a) Firing lever.—Ensure that the thumb-piece cannot be pressed in unless the safety catch is raised.

Ensure that when the safety catch is raised and the thumb-piece pressed the lock is fired.

(b) Trigger bar and spring.—Inspect for burrs or roughness on the trigger bar. Make sure that the spring forces the trigger bar forward quickly.

(c) Connecting rod. See that the adjusting nut is tight.

Testing the recoiling parts

7. Describe and demonstrate the method of testing the recoiling portions. This is done by removing the fusee spring, putting the crank handle vertical and working the recoiling portions backwards and forwards. They should move freely.

8. State that the recoiling portions must be weighed periodically. Explain and demonstrate how this is done. The fusee spring is removed and the crank-handle raised until it is vertical. The loop of the spring balance is placed over the right end of the crankshaft and pulled slowly to the rear. Immediately the recoiling portions begin to move, the weight shown on the spring balance is read. The mean of three readings should be taken and should not exceed four pounds.

9. Practise squad.

Testing the lock

10. State that there are five tests for the lock, each designed to test a different portion. The lock should pass each test, before being subjected to the next one. Explain and demonstrate these tests using the gun and wall diagrams:—

(a) *Side and extractor levers.*—The feedblock should be removed and the front cover left raised. The crank handle is drawn back on to the roller and then released. With the finger and thumb, the extractor is now tested for vertical play. If the extractor can be moved vertically, it indicates that the side or extractor levers are worn.

(b) *Bents of sear and firing pin.*—With the feedblock removed and the front cover raised, the crank handle is drawn back on to the roller. Keeping the thumbpiece pressed, the crank handle is allowed to go slowly forward on to the check lever. If the extractor jumps upwards as the firing pin goes forward, it indicates that the bents of the sear and firing pin are worn, and the striker is hitting the wall of the firing pin hole in the rear of the extractor.

(c) *Extractor.*—The face of the extractor should be examined for burrs or flaws. If there is any doubt, a good drill cartridge should be slid along the extractor grooves.

(d) *Nose of the trigger and bent of the tumbler.*—The lock is cocked and the sear depressed. The firing pin should now be held back by the nose of the trigger engaging in the bent of the tumbler. If it is not, then these are worn.

(e) *Firing pin.*—First, see that the point of the firing pin is not broken. A breakage in the body of the firing pin can be recognized without stripping the lock. The lock spring is released with the extractor raised. If undamaged the firing pin will then protrude from the firing pin hole. If it does not protrude, or if it does protrude and is not withdrawn when the lock is re-cocked, some part of the firing pin is broken.

11. Practice the squad in the lock tests.

Weighing the lock spring

12. Tell the squad that the lock must be weighed periodically to test the tension of the lock spring. Describe and demonstrate the procedure for doing this. The lock should be removed. With the crank handle held on the roller, the lock is then re-inserted in the gun but not connected on to the connecting rod. The connecting rod is then allowed to fold and go under the crankshaft, and the crank handle allowed to go forward. The lock is now held firmly in the gun with the side levers head free to move.

The loop of the spring balance is placed over the side levers head and drawn slowly upwards. Directly the tail of the tumbler moves, the reading is taken. The mean of three readings should be assessed and should be between 12 and 14 pounds.

13. Practise the squad in weighing the lock.

Conclusion

14. Questions from the squad.

15. Further practice as time allows in the tests. Soldiers should be required to explain their tests during practice.

16. Sum up main points.

LESSON 12.—EXAMINATIONS, TESTS AND ADJUSTMENTS (3)

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier further examinations and tests.

2. To teach the soldier to examine and pack the barrel.

Class and instructors

3. Squads under squad instructors. Squads seated in a semi-circle around the gun.

Periods

4. One 45-minute period.

Stores

5. Gun, tripod, spare parts box and case, asbestos packing and as many spare barrels as are available.

Preparation

5. Gun and tripod mounted. The other stores should be laid out on a table.

B CONDUCT OF LESSON

Approach

7. State the aim of the lesson (*see* para 1) and emphasize that a high degree of skill in packing the barrel is required. The efficient functioning of the gun depends to a large extent on good packing.

Examining the barrel

8. Tell the squad that the barrel should be examined for rust, cuts, erosion, bulges or metallic fouling. Explain that erosion is the pitting of the barrel caused by the force of explosion and is most liable to occur at the breech end of the barrel.

9. Describe and demonstrate the best method of examining the barrel. The barrel should be removed from the gun. Holding the barrel, first close to the eye and then some distance from the eye, the bore should be examined. The examiner should look at the walls of the barrel and not look through it. The barrel should be rotated slowly to make sure that no portion is missed. The lead should be carefully examined to see if undue erosion has taken place. The barrel should now be reversed and examined carefully from the muzzle end in a similar manner. Point out that metallic fouling may cause inaccuracy in shooting.

Packing the breech end of the barrel

10. State that if the gun leaks at the breech end, the packing is at fault and must be removed and renewed. The barrel casing must first be emptied and the recoiling portions removed.

11. Explain and demonstrate the method of packing the breech end of the barrel. A strand of asbestos is wound in the cannelure of the barrel and pressed together with a thin piece of wood or the point of a screwdriver until the cannelure is full. The asbestos is then smoothed down flush with the barrel. Before replacing the barrel in the gun, the packing is soaked in oil; this will swell the packing and give a tighter fit and also reduce friction.

12. Practise the squad.

Packing the muzzle end of the barrel

13. Explain and demonstrate how to pack the muzzle end of the barrel. The muzzle attachment is removed and the packing gland unscrewed. A length of asbestos is then oiled and wound loosely round the barrel, and as it is wound it is pushed in with a piece of wood or a screwdriver, until it is just behind the front cap of the barrel casing. The gland is then screwed on hand tight. The lock is hung and the recoiling portions worked by hand to ensure they move freely. If the packing is too tight, the gland can be removed and one or two strands of asbestos taken out. Finally the packing gland is screwed home using the combination tool.

14. Practise the squad.

Testing the packing

15. State that the packing should be tested by putting into the barrel casing sufficient water to cover the barrel, and working the recoiling portions backwards and forwards. There should be no leakage.

Finally the recoiling portions should be tested for correct weight.

Testing and examining miscellaneous parts

16. Show the squad the points to look for when examining the feedblock. The slide should be working freely and the pawls and springs in good condition.

17. Point out the parts of the sliding shutter that require attention. The catch and spring should work automatically and the shutter should move freely. If the shutter is difficult to move, it should be examined for:—

(a) Dirt or grit.

(b) Dented bottom plate, due to the connecting rod being dropped when there is no lock in the gun.

18. State that axis and all other pins should be inspected for serviceability.

Examining and adjusting the tripod

19. Tell the squad that there are many places where slight play may occur. Although the play in each part may be slight, the accumulated effect may cause serious unsteadiness in the gun. This can usually be seen in DP tripods.

There are two types of play:—

(a) Vertical play.—This is usually found in the elevating gear. Demonstrate how this is taken up by loosening the jamming bolt, screwing in the tumbler nut and retightening the jamming bolt. After making the adjustment, test to see if the play has been taken up.

(b) Lateral play.—This is normally due to the jaws of the cross-head having opened out, and it is the armourer's job to adjust.

20. Practise the squad in adjusting the elevating gear.

21. Point out the following further points for examination:—

(a) Clutch plates free from grit.
(b) Jamming handles not bent.
(c) Chains correct.
(d) Feathers on joint pins.

Conclusion

22. Questions from the squad.

23. Questions to squad on examining the feedblock sliding shutter and tripod.

24. Further practice if necessary in packing the barrel.

25. Sum up main points and progress made.

LESSON 13.—PREPARATION FOR FIRING

A INSTRUCTOR'S NOTES

Aim

1. To teach the method of preparing the gun for firing.

2. To teach the special measures required before using the gun in very cold weather, in sandy countries or before landing operations.

Class and instructors

3. Squads under squad instructors. Squads seated around the guns in a semi-circle.

Periods

4. One 45-minute period. This can well be a period immediately before firing the guns on the range.

Stores

5. Gun, tripod, spare parts case and box, cleaning rod, condenser can and tube, flannelette and cleaning material.

Preparation

6. Gun and tripod mounted with the other stores ready to hand.

B CONDUCT OF LESSON

Approach

7. Tell the squad the aim of the lesson (*see* paras 1 and 2).

Method of conducting

8. In the first part of the lesson no new technique is taught. The instructor should detail the sequence of preparing the gun and the squad should do all the preparation with the instructor supervising.

Preparing the gun for firing

9. Have the gun stripped down and all parts cleaned and examined by the squad.

10. See that the following parts are now oiled:—

Outside of barrel.

Recoiling portions including the face of the lock.

Ramps.

Trigger bar.

11. Detail one of the squad to check the oil in the traversing handles and in the can in the spare parts case.

12. Have the gun reassembled and order the following parts to be dried:—

Inside of the barrel.

Muzzle cup.

Muzzle attachment.

Blast deflector.

13. See that the muzzle cup and front cone are screwed tight. Unless these are secure they may work loose during firing and cause an accident.

14. Have the gun levelled and the barrel casing filled with water. See that the condenser tube is undamaged and test the fitting of it to the gun. Order a man to fill the condenser can two-thirds full of water.

15. Detail men of the squad to weigh:—

Fusee spring.

Recoiling portions.

Lock spring.

16. Have the contents of the spare parts box and case checked.

17. Order the squad to pack the cannelure of the spare barrel and to examine the tripod.

18. All sealed liners must be inspected for corrosion of the soldering. Any liners corroded should not be used.

19. Finally, state that the barrel should now be gauged with the .306-inch gauge plug. (*See* Lesson 16).

Action in cold weather

20. State that the following action will be taken to prepare the gun in cold weather:—

(a) Lubrication, including packings, will be carried out with the following oils:—

Above 40 degrees F, Oil OX-52 or OX-13.
Zero degrees to 40 degrees F, Oil OX-13 or Grease LG-380.
Zero degrees to —40 degrees F, 50/50 mixture of kerosene, vapourising, and Oil OX-13, or Grease LG-380.
(In emergency, kerosene burning may be used in lieu of kerosene vapourising).

At temperature of 40 degrees F and below, particular attention will be paid to the following points:—

(i) Mechanism will be stripped, wiped clean and lubricated with oils as above.

(ii) Ensure that firing pins are free in their housings, as the firing pins may freeze up, although other parts of the mechanism work freely.

(iii) Elevating gears will be thoroughly rinsed with gasoline, allowed to dry and then lubricated with oils as above.

(b) The weight of the recoiling portions will be kept as low as possible, *ie*, between 2 lb and 3 lb and the fusee spring will be adjusted to not more than 7 lb at the start of firing. The recoiling portions will be worked by hand at frequent intervals.

(c) Straw, sacking or blankets should be wrapped around the barrel casing. When hard frosts are expected barrel casings will be emptied and refilled with water diluted with 30 per cent glycerine, glycerine residue or glycol.

When it is necessary for the solution to be "topped up" water only will be added when glycerine or glycerine residue has been used, as these do not boil away; this is not the case with glycol.

Care will be taken not to exceed the 30 per cent solution glycol as a stronger solution gives off harmful fumes.

In temperatures from zero to —40 degrees F a solution of 50 per cent glycerine or glycerine residue will be used. Glycol will not be used in these temperatures.

Action in sandy countries

21. State that only a small quantity of oil will be used. Working parts will be wiped over with a slightly oily rag, which will prevent rust through the night and will give sufficient lubrication for working the gun during firing.

Action before landing operations

22. State that all equipments which are to be involved in landing operations will be smeared with Grease LG-380 or in an emergency Grease LG-280 thinly applied. Equipment which will be needed for immediate

use will be smeared on the outside only. The internal working parts will be lubricated as in para 20 *(a)* above. The earliest opportunity will be taken of wiping dry and re-oiling.

Conclusion

23. Questions to and from the class.

24. Sum up main points.

LESSON 14.—POINTS DURING FIRING

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier the points to which attention should be paid during firing to ensure that the gun will maintain a high rate of sustained fire.

2. To explain the action to be taken if defective ammunition is encountered.

Class and instructors

3. Squads under squad instructors. Squads seated in a semi-circle around the stores.

Periods

4. This lesson may be taught either before or during a period of range work. Alternatively it can, if necessary, be taught with Lesson 13.

Stores

5. Gun, condenser can and tube, tripod, spare parts box and case and ammunition liners (one with unbroken label).

B CONDUCT OF LESSON

Approach

6. Tell the squad the aims of the lesson. (*See* paras 1 and 2).

Points during fire

7. State that the supply of water must always be kept in mind. As soon as the water begins to boil and so long as it continues to boil, about 1½ pints will be lost for every two belts fired.

8. Explain that the No. 2 must ensure that:—

(a) The belt is in line with the feedblock.

(b) The belt has free movement.

(c) The cardboard packing strips are not removed from the belt before firing.

Unless these points are attended to, stoppages will result.

9. State that all repairs must be carried out immediately. To replace any part of the lock, the ordinary sequence for stripping the lock is followed until the broken part is reached. The only exception to this is in the case of a broken lock spring when the parts fall clear. In such a case, a new lock spring may be inserted without stripping the lock.

10. Point out that the following duties should be carried out during a lull in firing:—

(a) The bearing parts of the barrel, the recoiling portions, the ramps and the trigger bar should be oiled.

(b) The tightness of the front cone, muzzle cup and jamming handles should be checked.

(c) It should be made sure that the end of the condenser tube is below the level of the water in the condenser can.

11. Practise the squad as necessary.

Defective ammunition

12. State that should ammunition be found defective in any way, the following procedure will be adopted:—

(a) The type of ammunition, the manufacturer's initials and the date of manufacture will be carefully recorded.
Point out where these details can be found on the label.

(b) The liner will be returned to the unit quartermaster and any other ammunition of this type will be set aside and not used.

Conclusion

13. Questions to and from the class.

14. Sum up main points.

LESSON 15.—POINTS AFTER FIRING

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier the points that must be carried out after firing.

Class and instructors

2. Squads under squad instructors. Squads seated in a semi-circle round the stores.

Periods

3. This lesson can be taught immediately after firing on the range.

Stores

4. Gun, tripod, condenser can and tube, spare parts case and box, cleaning rod, flannelette and cleaning material.

B CONDUCT OF LESSON

Approach

5. State the aim of the lesson.

6. The instructor can best teach this lesson by telling the squad what points require to be carried out stage by stage and by supervising their work.

7. Tell the squad that there are certain points which must be carried out immediately after firing on the range and other points which must be dealt with later, on return to barracks.

On the range

8. The following points must be carried out on the range:—

(a) The gun is unloaded and the lock. blast deflector, muzzle attachment and muzzle cup removed, and the front cone loosened.

(b) Superficial fouling is removed from the barrel with the cleaning rod and oiled flannelette, followed by dry flannelette. The barrel is then re-oiled.

(c) The lock, blast deflector, muzzle attachment and cup are oiled.

(d) Finally, the gun is re-assembled. It may be of assistance in cleaning the barrel on return to barracks if the warm water is left in the barrel casing.

On return to barracks

9. The following points must be carried out on return to barracks:—

(a) The gun is stripped and all parts thoroughly cleaned.

(b) The tension of the fusee spring is reduced.

(c) If necessary, the barrel can be cleaned with boiling water as in Lesson 9, para 11.

(d) In order to prevent the formation of rust due to condensation of moisture on the outside of the barrel, the barrel casing should be emptied and the screws and cork plugs removed to allow a free circulation of air through the casing.

If the gun is likely to be left unused for any length of time, the packing should be removed from the cannelure and front packing gland.

(e) The tripod and spare parts should be overhauled and cleaned.

Conclusion

10. Questions from the class.

11. Inspect the gun and equipment.

12. Sum up main points and discuss any faults.

LESSON 16.—BARREL LIFE

A INSTRUCTOR'S NOTES

Aim

1. To teach how to determine the probable remaining life of a barrel.

2. To show how to compile MMG history sheets.

Class and instructors

3. This lesson should only be taught to officers and NCOs. Squads should be of not more than eight officers or NCOs. The squad should be seated in a semi-circle around the gun.

Periods

4. This period will take approximately 20 minutes.

Stores

5. Gun and tripod, cleaning rod, flannelette, as many gauges and spare barrels as available and MMG history sheets.

B CONDUCT OF LESSON

Approach

6. Tell the squad the aims of the lesson. The knowledge of the probable life of a barrel is of assistance to a MG unit commander in estimating the number of barrels required for a prolonged shoot.

Gauge plug

7. Describe the .306-inch gauge plug. These are the principal features to which attention should be called:—

(a) The plug is accurately dimensioned to .306-inch for about 1½ inches from one end.

(b) The flat surface is graduated in 1/10 inches from 2.75 inches to 4.5 inches from the .306-inch end.

8. State that the following instructions will be adhered to when using the gauge plug:—

(a) Before gauging, barrels should be cleaned.

(b) Do NOT gauge when the barrel is warm, *ie*, after using boiling water, or when the friction of the double pullthrough has warmed the barrel.

(c) Inspect the gauge periodically to ensure that it has not burred or worn.

(d) When the plug is not in use it must always be kept slightly oiled in the case provided for it.

(e) Check the gauge periodically with the gauge held by the unit armourer.

9. Explain and demonstrate the method of using the plug:—

(a) When the barrel is not in the gun.—The case is unscrewed and the plug is removed. The two portions of the case are screwed together again and the threaded end of the plug is screwed into the shorter end of the case, so that the plug and case now form a straight rod. Without using force, the plug is inserted as far as it will go into the breech of the barrel and the measurement in inches is read on the graduated stem of the gauge. The reading should be taken from the rear end of the barrel face where the rim of the cartridge seats itself.

(b) When the barrel is in the gun.—The process is the same as in *(a)* above, but the threaded end of the plug is screwed into the longer portion of the case so that the instrument is L-shaped. The rear cover is opened, the lock removed and holding the plug with the handle uppermost as when using a clearing plug, it is gently inserted into the barrel.

Stress that under no circumstances whatever are marks or scratches to be made on the gauge.

10. Practise the squad in using the plug with various barrels in and out of the gun.

11. Describe the method of determining the probable remaining barrel life using the table given below. State that the table is only to be used as a general indication of what may be expected.:—

Plug enters in inches	*Probable remaining life in rounds*
2.75	7,000
2.80	6,000
2.85	5,000
2.90	4,000
2.95	3,200
3.00	2,600
3.05	2,150
3.10	1,750
3.15	1,420
3.20	1,100
3.25	850
3.30	600
3.35	400
3.40	250
3.45	100
3.50	REJECT

12. Emphasize most strongly that barrels must be rejected for shoots in which safety is involved when the gauge plug enters at 3.5 inches, irrespective of the number of rounds actually fired.

MMG history sheets

13. State that the MMG history sheet provides an accurate and easily compiled method of recording:—

(a) The number of rounds fired by each barrel.

(b) The entry of the gauge plug.

(c) Any casualties sustained by the gun.

It is the responsibility of the No. 1 under the supervision of the section commander to maintain the history sheet for his gun and enter it up at the end of each period when live ammunition is used.

14. Explain that one sheet is used for each gun and describe briefly how to enter it up.

15. A suggested *pro forma* is shown on the next page.

Conclusion

16. Questions to and from the squad.

17. Sum up main points.

MMG HISTORY SHEET

Gun MG Vickers Regd No. .... Unit No. ....

Service Barrel Regd No. .... Spare Barrel No. ....

Date	Rounds fired		No. 1's Signature	Gauge .306" enters		Casualties	Action taken	Remarks	Platoon Comd's Initials
	Service	Spare		Service	Spare				

CHAPTER 4

SPARE PARTS AND REPAIRS

LESSON 17.—DESCRIPTION AND PACKING OF SPARE PARTS

A INSTRUCTOR'S NOTES

Aim

1. To teach the names and use of the various spare parts carried so that, should a part of the gun be broken or damaged, a spare part can be obtained with the minimum of delay.

2. To teach the correct method of packing the spare parts.

Class and instructors

3. Squads under squad instructors. Squads seated round a table.

Stores

4. Gun and tripod, spare parts case and box.

Periods

5. One 45-minute period.

Preparation

6. Mount the gun near the table so that everyone can see. Check the contents of the spare parts case and box.

B CONDUCT OF LESSON

Approach

7. State the aim of the lesson (*see* paras 1 and 2). Explain that generally speaking the parts that are most frequently required are contained in the spare parts case. There is one spare parts case for each gun. The spare parts box, of which there is one to each section, contains a reserve of spare parts and certain additional spares which are not so frequently required.

Spare parts case

8. Put all the contents of the spare parts case on the table.

9. Name each of the parts in the spare parts case and state the number carried, and order various members of the squad to pick up the parts from the table.

10. The following are the contents of the spare parts case:—

Contents of spare parts case

Balance, spring	1
Can, oil	1
Extractors	2
Lock, breech	1
Plug, clearing	1
Spring, fusee	1
Wallet	1
Tool combination	1

Wallet

11. Name each of the parts contained in the wallet, and state the number carried. Ask various members of the squad to pick up the parts from the table and indicate where they would go on the gun.

12. The following are the contents of the wallet:—

Contents of the wallet

Bottles, oil, Mark 4 or 5	1
Cork for plug	1
Cup, muzzle attachment	1
Disc, muzzle attachment	1
Fusee, with chain	1
Levers, bottom	1
„ top	1
Packing, asbestos	1
Pins, split, lever feed block	1
„ trigger lock	1
„ tumbler	1
„ firing	2
„ keep split, $\frac{1}{8} \times 2\frac{1}{2}$ inches (for Mark 4 tripod mounting)	3
Pliers, side cutting, pairs	1
Protector, muzzle	1
Pull-through double	1
Punches, No. 3	1
„ No. 5	1
Screwdrivers, small	1
Sear, with spring	1
Springs lock	2
Trigger	1
Tumbler	1
Washer, adjusting No. 1, .003-inch	3
„ „ No. 2, .005-inch	3
Wire gauze (pieces)	2
Washers leather	1

13. Show how to pack the contents of the spare parts case. All the contents of the wallet go into the rear pocket of the wallet with the exception of the screwdriver and pliers which fit into the front pocket. The wallet is then fastened with its strap and pushed into the case. The oil can can then be pushed down in front of the wallet and the clearing plug, combination tool and the fusee spring stood on end alongside the oil can. The extractors can then be placed in, and the balance spring pushed into a fold of the wallet. Finally the lock can be placed flat on its side on top and the case fastened with its strap.

Spare parts box

14. Put all the contents of the spare parts box on the table.

15. Name each of the parts contained in the spare parts box, and state the number carried. Detail one of the squad to pick the parts from the table and indicate where they would go on the gun or what tools would be used for various operations.

16. The following are the contents of the spare parts box:—

Contents of spare parts box

Blocks, feed, RH	2
Boxes, patch, first aid complete ...	1
„ small parts	1
Brushes, oil, MG	1
Bush, axis, side levers	1
Chains, crosshead joint	1
Collars, roller	1
Cork for plug	2
Cups, muzzle attachment...	1
Discs, muzzle attachment	4
Fusee, with chain	1
Gib	1
Hammer	1
Lever, extractor, left	1
„ „ right	1
Packing, asbestos (5-yard pieces) ...	8
Pins, crosshead joint	1
„ elevating joint	1
„ split, keeper, $\frac{1}{16}$-in × 1-in	3
„ trigger lock	1
„ tumbler	1
„ firing	4
„ split, collar, roller	2
„ split, keeper $\frac{1}{8}$-in × $2\frac{1}{2}$ inches (for Mark 4 tripod mounting)	6
„ split bush, axis, side lever	1
„ muzzle attachment	1
„ T fixing rear cross-piece	1
Plugs, cork, complete	1
„ screwed	1
„ front cover catch	1
Plungers, front cover catch	1
Roller	1
Screws, clamp, checking traverse ...	1
Sights, fore	1
„ tangent	1
Spanner, adjustable	1
Springs, bottom pawl	2
„ rear cover lock	4
„ front cover catch	2
„ gib	2
„ lock	8
„ safety catch with piston ...	4
„ sear	2
„ shutter catch	2
„ tangent sight	1
„ top pawls feed block	4
„ trigger bar	4

Washers, adjusting No. 1...	4
„ „ No. 2...	4
„ elevating nut (tripod Mk 4) ...	6
Wire gauze (pieces)	8

17. Show how to pack the contents of the spare parts box. The feedblocks, hammer, tangent sight, adjustable spanner, muzzle cup and discs fit into their respective brackets in the box. All the small spare parts, pins springs, etc, go into the small tin, which fits in the slots on the side of the box, and the remainder of the spares loose in the box.

18. Practise the squad in packing the spare parts case and box.

Competition

19. Various competitions on spare parts can be held to stimulate interest. One of these is described below:—

20. One spare parts competition can be based on the game " House." The instructor should prepare " House " cards beforehand with the names of spare parts in the squares instead of numbers. Each card should be different. One card is given to each member of the squad. The instructor then holds up various spare parts in turn, without naming them, and if the spare part is listed on their card the members of the squad tick them off. The game proceeds until one card is completed as in " House." The game can be made more difficult by the instructor requiring the squad to note on the card the number of the various spares carried and where they can be found.

Conclusion

21. Questions from the class.

22. Questions to the class. Specimen questions:—

(a) How many lock springs are carried, and where are they carried?

(b) The sear spring has broken on your gun. Where can you find a spare?

(c) The spare sear spring breaks. What action would you take now?

23. Sum up progress made.

Lesson 18.—REPAIRS

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier how to fit spare discs to the muzzle attachment.

2. To teach the soldier how to repair damage to the barrel casing.

3. To teach officers and NCOs the method of dealing with a damaged or displaced foresight.

Class and instructors

4. Squads under squad instructors. Squads seated in semi-circle around the guns.

Periods

5. This lesson will not take a full period for private soldiers.

6. For officers and NCOs—one 45-minute period.

Stores

7. Gun, tripod, spare parts case and boxes, patch, first aid.

8. When lateral adjustment of the foresight is taught, a portable blackboard will be required.

B CONDUCT OF LESSON

Approach

9. State the aim of the lesson (*see* paras 1 and 2).

NB—The lateral adjustment of the foresight may only be carried out by experienced officers and NCOs and will not be taught to private soldiers.

Fitting spare discs to the muzzle attachment

10. Tell the squad the metal discs wear out and are liable to damage.

11. Explain and demonstrate the method of replacing metal discs. The front cone is unscrewed and the edge of the disc is cut pushing up sufficient metal to form a hold for the pliers. The disc is then removed with the pliers and replaced with a new one. In replacing the disc, it may be necessary to tap it on to the front cone.

12. The squad cannot be practised in this as it will entail damage to the discs.

Perforation of the barrel casing

13. Tell the squad that should the barrel casing be pierced by bullets or other means, the gun will be put out of action. Semi-permanent repairs will be carried out by an armourer at the first opportunity, but to enable the gun to be in action again with the least possible delay, temporary " first aid " can be carried out by the gun team.

14. Explain and demonstrate how to repair an imaginary hole in the barrel casing. A rubber pad from the tin box in the spare parts box is forced over the hole. The metal plate is positioned on top of this and the whole fixed firmly to the barrel casing by means of the flexible clips provided.

15. State that a hole in the front cap of the barrel casing cannot be repaired in this manner, but a fairly water-tight repair can sometimes be effected by hammering in a wooden plug.

16. Practise the squad in carrying out first aid on the barrel casing.

Lateral adjustment of the foresight

17. Tell the squad that if the foresight has been damaged or displaced, lateral re-adjustment will be necessary. This will be carried out on the 30-yards range.

18. State that a target is required with a thick vertical line as an aiming mark and a thin pencilled line $\frac{5}{8}$-inches to the right of the centre of the thick line. Draw this on the blackboard and set it at suitable distance from the gun.

19. Say that the socket of the tripod must be perfectly upright and settling-in bursts fired into the stop butts. To avoid error caused by holding, the gun is punch fired, the belt being spaced in 10-round groups.

20. Demonstrate and teach punch firing. The gun is half-loaded and, with the thumb-piece pressed, a punch is inserted between the safety catch and the firing lever. The gun is then laid accurately on the thick line. If the crank handle is now pulled back, the belt pulled and the crank handle released the gun will fire a burst of 10 rounds. The aim is now re-checked to see that the tripod has not moved. The punch is removed and the gun unloaded and cleared.

21. Show on the blackboard that if the gun is correctly sighted, the MPI will fall on the thin pencilled line.

22. Demonstrate that if there is any error, the foresight is tapped in the same direction as the error, using a hammer and a No. 3 punch.

23. State that another burst of 10 rounds will be fired after each adjustment until sighting is correct. Adjustments are very fine and great care must be exercised in tapping the foresight. When the foresight is very tight, the bracket must be supported to prevent it being jarred loose.

24. Practise the squad by marking imaginary MPIs on the blackboard and having the squad adjust the foresight accordingly.

Conclusion

25. Questions to and from the squad.

26. Further practice if necessary.

27. Sum up main points.

CHAPTER 5

IMMEDIATE ACTION

INTRODUCTORY NOTES

Aim

1. The aim of all immediate action lessons is to teach the soldier the automatic action he will perform whenever the gun stops firing.

Instructors notes

2. The Lessons are divided into:—

Lesson 19.—Introduction and first position stoppage.
Lesson 20.—Second position stoppage.
Lesson 21.—Third position stoppage.
Lesson 22.—Fourth position stoppage.
Lesson 23.—Special stoppages.

Proficiency in Lessons 19 to 22 should be attained before teaching Lesson 23.

3. As proficiency is attained, training should be carried out in darkness, or with Nos. 1 and 2 blindfolded. Finally the squad should be practised in carrying out IA without the assistance of a No. 2.

4. The following general points should be brought out by the instructor at the appropriate moment during the lessons:—

(a) IA is not complete until the gun has been correctly relaid and fired.

(b) The rear cover should never be opened or closed with the tangent sight raised.

(c) If the lock cannot be drawn back, the front cover should be opened and the extractor forced down with the clearing plug handle.

(d) The rear and front covers, when lowered, must always be fastened correctly.

(e) A lock must never be changed with cartridges on the face of the extractor.

LESSON 19.—INTRODUCTION AND FIRST POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad should be seated on the right side of the gun so that they can see the crank handle. The instructor should sit facing them on the left of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape or natural target.

Preparation

4. The gun should be mounted with liner and spare parts case in position. The landscape target, if used, should be set up in front of the gun.

5. The setting up of the various phases is given below:—

Phase 1.—Half load, pull the crank handle slowly back until the horns of the extractor have engaged with the steps of the cams; pull the belt to the left and let go the crank handle.

Phase 2.—As for Phase 1 above but as soon as the No. 1 presses the thumb-piece the instructor will repeat the preparation and say:—"Gun fires a few rounds and stops again," and will also disturb the aim of the gun.

Phase 3.—Half load, pull the crank handle on to the roller and the belt to left, open the rear cover and lift out the lock. Slide the cartridge on the face of the extractor half way down the lower projection of the gib and replace the lock.

6. The instructor must practise until he can set up the gun and remedy stoppages rapidly without fumbling.

B CONDUCT OF LESSON

Preliminaries

7. Safety precautions will be carried out.

Approach

8. State the aim of IA (*see* Introductory Notes, para 1).

9. Tell the squad that failures in the automatic action of the gun may be classed under two headings:—

(a) Temporary, which are due to:—
(i) Neglect of points before or during firing.
(ii) Faulty ammunition.
(iii) Ignorance on the part of the gun team.
(iv) Failure of some part of the gun of which a spare is carried.

(b) Prolonged, which are due to failure of some part which *cannot* as a rule be put right by the team under fire, or without skilled assistance. These necessarily put the gun out of action for a more or less prolonged period.

Stress that on the knowledge and training of the gun team depends the rapidity with which temporary failure can be overcome.

The positions

10. State that the IA to be carried out depends on the position of the crank handle when the gun stops. The crank handle can stop in any of the following positions:—

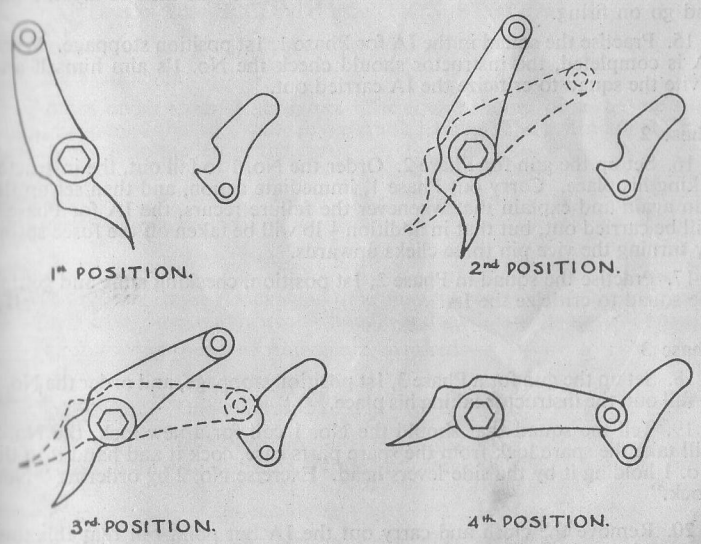


FIG 1

11. Show these positions to the squad and practise them in recognizing them.

IA drill

12. Tell the squad that as live ammunition is not being used, the instructor has to manipulate the action of the gun to produce the appearance of the gun having stopped in a certain position. It is obviously of little value if the gun numbers being exercised know what position stoppage is being set up. A special drill to overcome this has been evolved.

Explain this drill.—While the gun is being set up the Nos. 1 and 2 will be at the " Rest " position behind the gun with their heads turned away. As soon as the gun is set up, the instructor will cover the crank handle with a cloth, swing the gun back into position roughly aligned on the target, tighten the clamp and order " Position " raise the sights, and order " Fire".

When the cloth is removed from the crank handle it will imply that the gun has stopped firing.

Phase 1

13. Detail a No. 1 and 2, order a range and indicate a target. Set up the gun and order the No. 1 to fall out, the instructor taking his place.

14. Explain and demonstrate that when the cloth is removed, *ie*, the gun stops, the No. 1 will look and feel for the position of the crank handle. As it is in the 1st position, he will pull the crank handle on to the roller, pull the belt to the left and release the crank handle. He will then re-lay the gun and go on firing.

15. Practise the squad in the IA for Phase 1, 1st position stoppage. When IA is completed, the instructor should check the No. 1's aim himself and invite the squad to criticize the IA carried out.

Phase 2

16. Set up the gun for Phase 2. Order the No. 1 to fall out, the instructor taking his place. Carry out Phase 1, immediate action, and then set up the gun again and explain that whenever the failure recurs, the IA for Phase 1 will be carried out, but that in addition ½ lb will be taken off the fusee spring by turning the vice pin three clicks upwards.

17. Practise the squad in Phase 2, 1st position, checking aims and getting the squad to criticize the IA.

Phase 3

18. Set up the gun for a Phase 3, 1st position stoppage, and order the No. 1 to fall out, the instructor taking his place.

19. Tell the squad that should the No. 1 call for a new lock, the No. 2 will take the spare lock from the spare parts case, cock it and hand it to the No. 1 holding it by the side levers head. Exercise No. 2 by ordering " New Lock."

20. Remove the cloth and carry out the IA but point out that this time the crank handle will not go forward.

21. Demonstrate that when the crank handle will not go forward, the No. 1 will call for a new lock, and pull the crank handle back on to the roller. He will then open the rear cover, clear the face of the extractor, change the lock and reload. Finally he will re-lay the gun and go on firing.

22. Practise the squad in Phase 3, 1st position stoppages, checking all aims and getting the squad to criticize the IA.

Conclusion

23. Questions from the squad. The instructor should not allow himself to be involved in a discussion on how the stoppage occurs or is cleared. He should explain that the causes of all stoppages will be taught in later lessons, and that for the moment all that the squad are required to absorb is an instinctive and automatic drill to be carried out whenever the gun stops.

24. Further practise in all phases.

25. Sum up main points.

Note

26. In order to avoid " dead spots " in the lesson, whilst the instructor is setting up stoppages, he should question the class on how to recognize the various positions of the crank handle and on the causes of temporary stoppages etc.

LESSON 20.—SECOND POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad should be seated on the right of the gun so that they can see the crank handle. The instructor should sit facing them on the left of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape or natural target.

4. The following prepared rounds are required:—

One damaged round.
One separated case.
One telescoped round.

These can be manufactured by the armourer.

Preparation

5. The gun should be mounted with the liner and spare parts case in position. The landscape target, if used, should be set up in front of the gun.

6. The setting up of the various phases is given below:—

Phase 1.—Insert a damaged drill cartridge as the first cartridge in the belt and load.

This phase may be simulated on the range by inserting a damaged drill cartridge in the belt.

Phase 2.—Open the rear cover, lift out the lock, place the prepared telescoped round between the upper and lower projections of the gib, replace the lock and allow the crank handle to go forward under control. Lower the rear cover and pull the belt to the left.

Phase 3.—Half load, raise the rear cover and lift out the lock. Place the front portion of a separated case lightly over the bullet of the round on the extractor. Replace the lock allow it to go slowly forward, ensuring that the separation will remain in the chamber. Close the rear cover and pull the belt to the left.

Phase 4.—As for Phase 3 explaining that this is a recurrence.

7. The instructor must practise until he can set up the gun and remedy stoppages rapidly without fumbling.

B CONDUCT OF LESSON

Preliminaries

8. Safety precautions will be carried out.

Revision

9. Revise the 1st position IA.

Phase 1

10. Detail a No. 1 and 2 and indicate a target. Set up the gun and order the No. 1 to fall out, the instructor taking his place.

11. Tell the squad that should the No. 1 call " Clearing Plug," the No. 2 will remove it from the spare parts case, push the centre pin to the rear and hold it handle upwards, convenient for the No. 1 to grasp. Exercise No. 2.

12. Explain and demonstrate that when the gun stops, the No. 1 will look and feel for the position of the crank handle. As it is in the 2nd position, he shouts, " Clearing plug " and knocks the crank handle on to the roller. He will open the rear cover, lift out the lock and examine the round on the face of the extractor. If he finds the round is damaged, he will shout " Not required," remove the round, replace the lock and fully load. Finally, he will re-lay the gun and go on firing. The No. 2 will replace the clearing plug in the spare parts case.

13. Practise the squad in Phase 1, 2nd position IA, checking all aims and getting the squad to criticize the IA.

Phase 2

14. Set up the gun for a Phase 2 stoppage and explain that should the No. 1 find a perfectly good round on the face of the extractor with a portion of an empty case telescoped on it, he will carry out the IA as for Phase 1.

15. Practise the squad in Phase 2.

Phase 3

16. Set up the gun for a Phase 3 stoppage, order the No. 1 to fall out, the instructor taking his place, and explain and demonstrate that should the No. 1 find a perfectly good round on the face of the extractor, he will remove it, replace the lock in the gun and keeping the crank handle to the rear take the clearing plug in his left hand from the No. 2, ensuring that the centre pin is pushed back. He will insert the tapered portion into the chamber and push the pin well home by allowing the lock to go forward and striking the knob of the crank handle. Then, keeping a firm pressure on the crank handle, he will rock the clearing plug handle from side to side, withdraw the lock and knock back the handle of the plug thereby withdrawing the tapered portion from the chamber. He should then check to see that the front portion of the separated case is on the plug. He will then return the clearing plug to the No. 2, lower the rear cover and fully load. Finally he will relay the gun and go on firing.

No. 2 will remove the separated case by pushing back the centre pin and replace the clearing plug in the spare parts case.

17. Practise the squad in Phase 3, 2nd Position IA.

Phase 4

18. State that if the No. 1 finds the gun is getting a series of Phase 3 stoppages, he will carry out the normal IA and in addition change the lock.

19. Tell the squad that if this fails to remedy the succession of stoppages, the No. 1 will call for a No. 1 and No. 2 washer from the spare parts case, and remove the lock.

He will place the washers on the connecting rod, resting on the adjusting nut. The washers will be placed behind the adjusting nut at the first opportunity.

Conclusion

20. Questions from the squad.

21. Further practice in all phases and including occasional 1st positiion stoppages.

22. Sum up main points.

Note

23. In order to avoid " dead spots " in the lesson, whilst the instructor is setting up the stoppages he should question the class on the IA that have already been taught.

LESSON 21.—THIRD POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad should be seated on the right of the gun so that they can see the crank handle. The instructor should sit facing them on the left of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscapes or natural target.

4. One prepared thick rimmed drill cartridge is requierd. This can be made by an armourer.

Preparation

5. The gun should be mounted with liner and spare parts case in position. The landscape target, if used, should be set up in front of the gun.

6. The setting up of the various phases is given below:—

Phase 1.—Half load and then pull the crank handle on to the roller and raise the rear cover. Pull the belt just sufficiently to move a cartridge halfway into the face of the feedblock. Allow the crank handle to go slowly forward so that it will remain in the third position and lower the rear cover.

Phase 2.—Proceed to load, but ease the crank handle forward the second time so that it remains in the third position.

As soon as No. 1 has completed the IA, the instructor will repeat the setting up and say "Gun fires a few rounds and stops again," at the same time disturbing the aim of the gun.

Phase 3.—Pull out the fourth cartridge in the belt about half an inch. Half load and pull the crank handle slowly back until the horns of the extractor have engaged in the steps on the cams. Draw the recoiling portions to the rear by forcing the knob of the crank handle forward and the tail to the rear, at the same time pulling the belt to the left. Allow the recoiling portions to go forward, draw back the crank handle and then release it and it will remain in the third position.

This phase may be simulated on the range by placing a liner at an angle to the feedblock.

Phase 4.—Place a thick rimmed drill cartridge as the second round in the belt. Fully load, easing the crank handle forward the second time. When resistance is met, give the crank handle a light tap downwards.

7. The instructor must practise until he can set up and remedy stoppages rapidly without fumbling.

B CONDUCT OF LESSON

Preliminaries

8. Safety precautions will be carried out.

Revision

9. Revise the squad in the second position IA.

Phase 1

10. Detail a No. 1 and No. 2 and indicate a target. Set up the gun and order the No. 1 to fall out, the instructor taking his place.

11. Explain and demonstrate that when the gun stops, the No. 1 will look and feel for the position of the crank handle. As it is in the third position, he will raise the crank handle slightly, pull the belt to the left and strike the crank handle down on to the check lever. He will then re-lay the gun and go on firing.

12. Practise the squad in this phase, checking aims and getting the squad to comment on the IA.

Phase 2

13. Set up the gun for the second phase, order the No. 1 to fall out, the instructor taking his place. Apply the immediate action for the first phase and then set up the gun again, and explain and demonstrate that should the failure recur the initial IA is performed again and the gun is then unloaded. The lock is lifted out and rested on the hinge of the rear cover. The No. 1 will then oil the lock, paying special attention to the extractor, replace the lock and lower the rear cover. He will then reload, re-lay the gun and go on firing.

14. Practise the squad in this phase.

Phase 3

15. Set up the gun for the third phase, order the No. 1 to fall out, the instructor taking his place. Tell the squad that if the No. 1 calls out " Feedblock " the No. 2 at the appropriate moment will depress the pawls, withdraw the belt and straighten any displaced rounds.

16. Explain and demonstrate that if, after carrying out the initial IA for the 1st phase, the No. 1 cannot strike the crank handle on to the check lever he will feel the top pawls of the feedblock and if they are out and rigid he will call out " Feedblock," pull the crank handle on to the roller, raise the rear cover, lift the extractor and put the horns of the extractor on the steps of the cams, and lower the rear cover again.

The No. 1 will then draw back the recoiling portions by pushing forward on the knob of the crank handle and pulling the tail to the rear while No. 2 depresses the pawls and withdraws the belt. No. 1 will then allow the recoiling portions to go forward while No. 2 is straightening the rounds in the belt. The No. 1 will bring the crank handle back on to the roller, half load, re-lay the gun and go on firing.

17. Practise the squad in this phase.

Phase 4

18. Set up the gun for the fourth phase, order the No. 1 to fall out, the instructor taking his place.

Explain and demonstrate that if the No. 1 calls out " Extractor," the No. 2 will take the clearing plug from the spare parts case, and when the front cover has been opened he will place the handle of the clearing plug on the top of the extractor holding it with his left hand, and will give it a sharp blow downwards with his right hand. He will then depress the feedblock pawls, withdraw the belt, remove the first round, and replace the clearing plug in the spare parts case.

19. Explain and demonstrate that if, after carrying out the initial IA the crank handle again will not go down on to the check lever and the pawls

of the feedblock are in and slack, the No. 1 will call out "Extractor." He will knock down the sights, open the front cover for the No. 2 to force down the extractor, and at the same time No. 1 will pull back the crank handle, holding the crank handle to the rear. The No. 1 will then close the front cover, open the rear cover, lift out the block and clear the face of the extractor, while the No. 2 is withdrawing the belt and removing the first round. The No. 1 will finally reload, re-lay the gun and go on firing.

20. Practise the squad in this phase.

21. Explain that sometimes it may be necessary, during the immediate action for a feedblock stoppage, for the No. 2 to force down the extractor as in para 18.

Conclusion

22. Questions from the squad.

23. Further practice in all phases including occasional 1st and 2nd position stoppages.

24. Sum up main points.

Note

25. In order to avoid " dead spots " in the lesson, while the gun is being set up the instructor can question the squad on the stoppages already taught.

Lesson 22.—FOURTH POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad should be seated on the right of the gun so that they can see the crank handle. The instructor should sit facing them on the left of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape or natural target.

Preparation

4. The gun should be mounted with the liner and spare parts case in position. The landscape target if used should be set up in front of the gun.

5. The setting up of the various phases is given below:—

Phase 1.—Load and press the thumb-piece.

Phase 2.—Load and press the thumb-piece. As soon as No. 1 has performed the IA for Phase 1, the instructor will say " Gun will not fire".

Phase 3.—Load and press the thumb-piece. As soon as the No. 1 has performed the IA for Phase 1, the instructor will say " Gun fires a few rounds and stops again".

Phases 1 and 2 may be simulated on the range by inserting one and three drill cartridges in the belt respectively.

B CONDUCT OF LESSON

Preliminaries

6. Safety precautions will be carried out.

Revision

7. Revise the squad in 3rd position stoppages.

Phase 1

8. Detail a No. 1 and 2, indicate a target and set up the gun.

9. Explain that when the gun stops, the No. 1 will, as taught, look and feel for the position of the crank handle. If it is in the 4th position, he will fully load, re-lay the gun and go on. firing

10. Practise the squad.

Phase 2

11. Set up the gun for Phase 2 and tell the squad that if the gun fails to fire after applying the IA, the No. 1 will shout for a new lock, unload and change the lock, re-load, re-lay the gun and go on firing.

12. Practise the squad.

Phase 3

13. State that if the gun has a series of Phase 1 failures, the No. 1 will unload and place a No. 1 and No. 2 washer on the connecting rod as in a 2nd position stoppage. He will then reload, re-lay the gun and go on firing.

Conclusion

14. Questions from the squad.

15. Further practice in all phases, including all positions stoppages.

16. Sum up main points.

Lesson 23.—SPECIAL STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squad under squad instructors. The squad should be seated on the right of the gun so that they can see the crank handle. The instructor should sit facing them on the left of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, covering for crank handle and landscape or natural target. A spare parts box is also required.

4. Two prepared thick-rimmed drill cartridges are required. These can be made by an armourer.

Preparation

5. The gun should be mounted with the liner and spare parts case in position. The spare parts box should be placed a few yards in the rear.

6. The setting up of the various phases is given below:—

Special A.—Half load and remove the fusee box and spring. Pull the crank handle on to the roller and the belt to the left. Replace the fusee box with the spring detached from the fusee.

Special B.—Place two thick-rimmed drill cartridges as the second and third rounds in the belt. Fully load but ease the crank handle forward the second time. When resistance is met, give the crank handle a light tap downwards.

Special C.—Unload and press the thumb-piece. Pull the belt until the first round is in front of the bottom pawls. When the No. 1 has carried out the IA for Phase 1, 4th position stoppage, he should be told that the gun fires two rounds and stops again in the same position,

Special D (i).—Give the order "**Load.**" As soon as the crank handle touches the check lever for the second time, say "**Gun firing.**"

Special D (ii).—Order "**Load**" and "**Fire**" followed by "**Stop.**" Directly No. 1 releases pressure from the thumb-piece, say "**Gun still firing.**"

7. The instructor must practise until he can set up and remedy the stoppages without fumbling.

B CONDUCT OF LESSON

Preliminaries

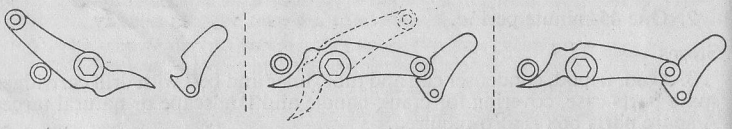
8. Safety precautions will be carried out.

Revision

9. Revise the squad in one or two of the previous stoppages taught.

Approach

10. State that the Immediate Actions which have been already taught for the usual four positions will remedy most stoppages of the gun, but there still remain certain stoppages, when the crank handle may or may not stop in any one of these positions, which will not be remedied by the IA already taught. Hence there is a further series of four stoppages which are classed as "Special" and have their own particular IA . In these four special stoppages, the crank handle normally stops in one of the following positions:—



SPECIAL "A" SPECIAL "B" SPECIAL "C"

FIG 2

Special A

11. Detail a No. 1 and 2 and indicate a target. Set up the gun and order the No. 1 to fall out, the instructor taking his place.

12. Tell the squad that should the No. 1 call for a fusee or fusee spring, the No. 2 will get one from the spare parts case and pass it to the No. 1.

13. Explain and demonstrate that when the gun stops, the No. 1 will look and feel for the position of the crank handle. He may find it in any position, but it will most probably be right back. In any case he can easily identify this stoppage as there will be no tension on the crank-handle. The No. 1 will remove the fusee box and identify the broken part, calling for a replacement. The No. 1 will pull the belt to the left and return the crank handle to the check lever, replace the new fusee or spring and if necessary, adjust the spring to the correct weight. He will then re-lay the gun and go on firing.

14. Practise the squad, checking aims and getting the squad to criticize the No. 1's IA.

Special B

15. Revise the squad in the IA for a Phase 4, 3rd position stoppage.

16. Tell the squad that if after applying the IA the failure recurs immediately, the IA will be repeated but with the difference that the No. 1 will shout for a new lock. After clearing the face of the extractor he will change the lock. He will then reload, re-lay the gun and go on firing.

17. Practise the squad.

Special C

18. Revise the squad in the IA for a Phase 1, 4th position stoppage.

19. State that if at any time the No. 1 calls for a new feedblock, the No. 2 will call for one to the No. 3, who will obtain it from the spare parts box and bring it to the gun.

20. Tell the squad that if after carrying out the IA for a 4th position stoppage the gun fires two rounds and stops again, the No. 1 will shout "New Feedblock," change the feedblock, reload, re-lay the gun and go on firing. Explain that while waiting for the new feedblock the gun can be kept firing either by reloading and firing two rounds, or by the No. 2 pulling the belt through the feedblock from the left, and so doing the work of the feedblock.

21. Practise the squad using Nos. 1, 2 and 3.

Special D

22. State that occasionally what is known as a "Runaway Gun" may occur. This may take two forms and requires an IA to remedy it.

(a) As the gun is being loaded and the crank handle goes forward on to the check lever for the second time, the gun starts firing and will continue to fire until the belt is expended, unless it is stopped. To stop the gun, the No. 1 should pull a round out of the belt a suitable distance from the feedblock. When the gun stops, No. 1 will pull the crank-handle on to the roller and the No. 2 will remove the belt. The No. 1 will then change the lock, reload, re-lay the gun and carry on firing.

(b) This may also occur during firing, when the No. 1 releases pressure on the thumb-piece and the gun continues firing. The IA is exactly the same.

23. Practise the squad in dealing with a " Runaway Gun."

24. Tell the squad that if at any time the gun cannot be stopped by releasing the thumb-piece and a stoppage occurs in any position, the IA will be:—

Pull the crank handle on to the roller, remove the belt and release the crank handle.

Stress that in the case of a 2nd position stoppage, extreme care must be taken that the extractor is kept down while the round is being removed.

25. Further practice in specials and all positions of IA.

26. Sum up main points.

CHAPTER 6

MECHANISM

INTRODUCTORY NOTES

Aim

1. The aim of all mechanism lessons is to teach the soldier how the mechanism of the gun operates.

Instructors notes

2. Throughout all mechanism lessons, the instructor should make the fullest use of diagrams, skeleton locks and the gun itself in order to make the soldier *see for himself* how the mechanism operates. Stereotyped verbal descriptions should be, and can be, avoided by the good instructor.

LESSON 24.—"FIRING ACTION FIRST SHOT" AND "ACTION ON RECOIL"

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad will be seated half on each side of the gun and the instructor at the rear of the guns.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner and belt with drill cartridges, spare parts case, empty cartridge case, skeleton lock, wall diagrams and a pointer.

Preparation

4. The gun will be mounted with the other stores to hand. The wall diagrams when required will be put up where they can be seen by the squad.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Approach

6. Tell the squad the aim of all mechanism lessons (*see* Introductory Notes, para 1).

Firing action, first shot

7. Load the gun and raise the rear cover. Remove the trigger bar.

8. Tell the squad that they will now see how the first shot is fired. Tell them to watch the trigger bar lever and then raise the safety catch and press the thumb-piece. Point out that the pawl near the bottom of the firing lever pushes forward the bottom of the trigger bar lever. As this is pivoted near the centre, the top moves to the rear.

9. Place the trigger bar over the trigger bar lever and trigger. Tell the squad to watch the trigger bar and again press the thumb-piece. Point out that as the top of the trigger bar lever moves to the rear it engages in the projection on the trigger bar and draws it backwards. The front wall of the slot in the trigger bar pulls the tail of the trigger to the rear.

10. Hold up the skeleton lock so that the squad can see it and, controlling the firing of it, explain that as the trigger bar pulls the tail of the trigger to the rear, the nose of the trigger is released from the bent of the tumbler. This allows the long arm of the lock spring to propel the firing pin forward on to the cap of the cartridge, thus firing the round.

11. Confirm the action in the lock using the wall diagrams.

12. Question the squad on firing action, first shot.

Action on recoil

13. Place an empty cartridge case between the upper and lower projections of the gib. Half load and press the thumb-piece. Remove the fusee box and spring. Remove the outer casing muzzle attachment and the right slide. Raise the rear cover.

14. Tell the squad to watch the recoiling portions. The instructor should now move to the front of the gun and, stating that he is representing the forces which work the gun, push the muzzle cup back. The squad should then see the recoiling portions move back about one inch. Point out that this backward movement would extend the fusee spring.

15. State that this backward movement is caused partly by recoil and partly by the effect of the muzzle attachment. Explain how the gases, which escape through the muzzle after the exit of the bullet, strike violently against the front cone and rebound on to the muzzle cup. This assists in driving the recoiling portions backwards.

The gases then escape through the vents in the outer casing.

16. Question the squad on action on recoil.

Conclusion

17. Questions to and from the squad.

18. Sum up main points.

LESSON 25.—FIRST ACTION IN THE FEEDBLOCK

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad will be seated half on each side of the gun and the instructor at the rear of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, spare parts case, an empty cartridge case, wall diagrams and a spare feedblock.

Preparation

4. The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions will be carried out.

Approach

6. Revise by question and answer " Action on Recoil."
Then state that this lesson deals with the effect of the backward movement of the recoiling portions on the feedblock.

First action in the feedblock

7. The instructor should set up the gun by placing an empty case between the upper and lower projections of the gib. He should half load and press the thumb-piece, raise the front cover and remove the outer casing muzzle attachment and fusee box and spring.

8. Point out the recess in the prolongation of the left side plate and tell the squad to watch it, whilst the instructor (representing recoil) pushes back the muzzle cup. The recess will be seen to move to the rear.

9. Show the squad that the recess in the prolongation of the left side plate carries back with it the stud on the bottom lever of the feedblock. Explain and demonstrate how the bottom lever acting on the top lever causes the slide to move to the right.

10. The instructor should now place a drill cartridge in front of the bottom pawls of the spare feed block. By operating the lower lever, he can show the squad how, when the slide moves to the right, the top pawls ride over the round and engage behind it. The bottom pawls prevent the round from slipping out of the feedblock.

11. Confirm the action of the feedblock using the wall diagrams.

12. Question the squad.

Conclusion

13. Questions from the squad.

14. Sum up main points.

LESSON 26.—BACKWARD ROTATION OF THE CRANK AND SECOND ACTION IN THE FEEDBLOCK

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad will be seated half on each side of the gun and the instructor at the rear of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, spare parts case, an empty cartridge case, wall diagrams, pointer and a spare feedblock.

Preparation

4. The gun will be mounted with the other stores to hand. The wall diagrams will be put up, when required, where they can be seen by the squad.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Approach

6. Tell the squad that this lesson deals with the actions that take place in the recoiling portions during the backward movement, and with the effect this has on the feedblock.

Backward rotation of the crank

7. Revise briefly " Action on Recoil " and set up the gun as follows:—
Place an empty case between the upper and lower projections of the gib. Half load and press the thumb-piece. Remove the fusee box and spring and the outer casing muzzle attachment. Raise the rear cover.

8. Tell the squad to watch the crank handle and slowly push back the muzzle cup. Point out that the backward movement of the recoiling portions causes the tail of the crank handle to roll on the roller, thereby rotating the crank. The rotation of the crank draws back the lock, in the same way as the human knee when bent draws back the foot. The rotation of the crank also causes the fusee to rotate and wind in the fusee chain, thereby further extending the fusee spring.

9. Tell the squad that at this stage the force of recoil is expended, but the momentum of the lock, connecting rod, crank and crank handle causes the crank handle to continue rolling against the roller. Demonstrate by pressing on the knob of the crank handle, and point out that this rolling of the crank handle assisted by the pull of the fusee spring forces the whole of the recoiling portions forward, with the exception of the lock. Show how the lock continues its backward movement for a short distance before it joins in the general forward movement.

10. Question the squad.

Second action in the feedblock

11. Revise, by question and answer, the " First action in the feedblock " and set up the gun as follows:—

Pull back the recoiling portions until the crank handle is vertical, close the rear cover and raise the front cover.

12. Force the recoiling portions forward by pressing on the knob of the crank handle, causing it to roll on the roller and tell the squad to watch the recess in the prolongation of the left side plate. They will see that as the recoiling portions move forward, the recess moves forward, carrying with it the stud on the bottom lever. The bottom lever acting on the top lever will move the slide back to the left.

13. Hold up the spare feedblock with a drill cartridge in front of the bottom pawls and the slide out to the right. Operate the lower lever by hand and show how the top pawls on the slide bring the cartridge in the belt to a position against the cartridge and bullet stops, ready to be gripped by the extractor. Explain how the belt as it moves to the left slides over the bottom pawls. These pawls are depressed as the cartridges pass over them, but rise again behind the fourth cartridge and prevent the belt from slipping back after the third round has been withdrawn by the extractor.

14. Confirm this with the aid of the diagrams.

15. Question the squad on the " Second action in the feedblock."

Conclusion

16. Questions to and from the squad.

17. Sum up main points.

LESSON 27.—BACKWARD MOVEMENT AND COCKING OF THE LOCK

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad will be seated half on each side of the gun and the instructor at the rear of the gun.

Periods

2. One 45-minute period

Stores

3. Gun, tripod condenser can and tube, liner with belt and drill cartridges, spare parts case, spare lock, skeleton lock and wall diagrams.

Preparation

4. The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Approach

6. Revise by question and answer "Action on Recoil " and set up the gun as follows:—

Place an empty case between the upper and lower projections of the gib. Half load and press the thumb-piece. Remove the fusee box and spring. Raise the rear cover.

7. Draw the lock slowly backwards by rolling the crank handle on the roller and point out the movement of the lock to the squad. They will see that as the lock moves backwards, the extractor withdraws a live round from the feedblock and the empty case from the chamber. The horns of the extractor move along the cams until the cartridge is clear of the belt. Show that as the extractor arrives at the end of the cams, it would be forced down by the ramps on the rear cover and thus bring the live round into line with the chamber. State that the empty case would probably fall off at this stage.

8. Hold up the spare lock with a drill cartridge on the extractor and let the squad see that the cartridge is prevented from falling off the face of the extractor by the lower projection of the gib.

9. Question the squad.

Cocking the lock

10. Set up the gun again and state that the squad will now see what is happening inside the lock.

11. Draw the lock slowly backwards again by rolling the crank handle on the roller. Point out that the rotation of the crank causes the base of the connecting rod to rise and force the side levers head upwards.

12. Hold up the skeleton lock, and, lifting the side levers head by hand, show how the tumbler is rotated on its axis pin and the firing pin is thus drawn to the rear. Show that the long arm of the lock spring bears on the firing pin and the short arm on the nose of the trigger. Consequently the withdrawal of the firing pin compresses the lock spring.

Point out that as the tumbler continues its rotation, the short arm of the lock spring forces the nose of the trigger over the bent of the tumbler. But the tumbler carries the firing pin still further to the rear until the sear, forced up by the sear spring, has its bent engaged in the bent of the firing pin. The firing pin is thus prevented from flying forward by the bent of the sear being engaged in the bent of the firing pin.

13. Confirm the mechanism of cocking the lock with the aid of the wall diagrams.

14. Question the squad.

Conclusion

15. Questions from the squad.

16. Sum up main points.

LESSON 28.—FORWARD MOVEMENT OF THE LOCK

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad will be seated half on each side of the gun and the instructor at the rear of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, spare parts case, spare lock and wall diagrams.

Preparation

4. The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Approach

6. Revise by question and answer the backward movement and cocking of the lock and set up the gun as follows:—

Half load. Remove the fusee box and spring. Pull the crank-handle on to the roller and pull the belt to the left. Raise the rear cover.

Forward movement of the lock

7. Explain that when the force of the explosion is expended, the fusee spring takes command and by unwinding the fusee chain from the fusee rotates the crank.

8. Push the crank handle slowly on to the check lever and show how the rotation of the crank forces the connecting rod forwards and downwards, thereby causing the lock to continue its forward movement. Let the squad see how, as the lock travels forward, the extractor forces the live round into the chamber and then is moved upwards by the side levers acting on the extractor levers. Demonstrate the action of the side levers with the spare lock.

9. Using the spare lock, point out that as the extractor rises, the lower projection of the gib slides over the base of the live round in the chamber and the top projection over the base of the round which has been moved into position in the feedblock. Show that the firing pin hole is thus brought opposite the cap of the live round in the chamber.

Seating for ejection

10. Remove the elevating joint pin and up-end the gun. Pull the crank handle on to the roller and place an empty case on the extractor opposite the firing pin hole.

11. Push the crank handle on to the check lever and show the squad how the empty case, if it has not fallen off before, will be forced off by the seating for ejection, as the extractor rises.

12. Lower the gun and replace the elevating joint pin.

Side plate springs

13. Point out the grooves in the sides of the extractor and explain that as soon as the extractor reaches its highest position, the side plate springs engage in the grooves. This prevents the extractor from falling if there were no cartridges on its face as it begins its backward movement. If it did fall, the horns would foul the cams in the breech casing.

Locking of the breech

14. Repeat the forward movement of the lock and explain that the final movement of the connecting rod and side levers head causes the lock to be forced slightly further forward and closes the breech. With the spare lock, point out that during the final movement the steps on the side levers travel over the bents of the extractor levers and the base of the connecting rod goes below the horizontal. This locks the breech during the explosion of the charge.

Conclusion

15. Questions from the squad.

16. Questions to the squad.

17. Sum up main points.

LESSON 29.—SUBSEQUENT SHOTS AND END OF BURSTS

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. The squad will be seated half on each side of the gun and the instructor at the rear of the gun.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, spare parts case, skeleton lock and wall diagrams.

Preparation

4. The gun will be mounted with the other stores to hand. The wall diagrams will be put up when required where they can be seen by the squad.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Approach

6. Tell the squad that they know the actions that take place from the moment when the thumb-piece is pressed until the second round is fed into the chamber. In this lesson they will see how the automatic fire of the gun is achieved and also how the gun stops when pressure is released from the thumb-piece.

Firing action, subsequent shots

7. Revise " Firing Action, First Shot " and set up the gun by half loading, raising the rear cover, removing the trigger bar and placing it over the trigger bar lever and trigger.

8. Draw back the lock, pull the belt to the left, and, controlling the trigger bar, allow the lock to go slowly forward. Explain that the firer, by maintaining pressure on the thumb-piece, holds back the trigger bar. Therefore each time the lock goes forward, the front end of the slot holds back the tail of the trigger before the lock is quite home.

9. With the skeleton lock cocked, push back the tail of the trigger and point out that by this means the nose of the trigger is prevented from engaging in the bent of the tumbler.

Explain and demonstrate that when the lock is home, the side levers head depresses the sear, thus allowing the long arm of the lock spring to drive the firing pin on to the cap and fire the charge. State that the depression of the sear is so timed that the firing pin is not released until the lock is in the firing position.

10. Question the squad.

End of bursts

11. Set up the gun by fully loading, and place the trigger bar over the trigger bar lever and trigger.

12. Release pressure on the thumb-piece and show the squad that the trigger bar resumes its normal position.

13. Using the skeleton lock, point out that this allows the short arm of the lock spring to force the nose of the trigger against the tumbler.

Thus, as the lock comes forward and the sear is depressed, the nose of the trigger engages in the bent of the tumbler and the firing pin is held back.

14. Question the squad.

Conclusion

15. Questions to and from the squad.

16. Sum up main points and progress made with mechanism.

CHAPTER 7

CAUSES OF STOPPAGES

INTRODUCTORY NOTES

Aim

1. The aim of the lessons in this chapter is to teach the soldier the cause of the various stoppages.

Instructors note

2. The lessons in this chapter should not be taught until the squad have attained proficiency in IA and mastered the mechanism of the gun.

LESSON 30.—CAUSES OF FIRST POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated on the right side of the gun with the instructor on the left of the gun and facing the squad.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, covering for crank handle and landscape or natural target.

Preparation

4. Gun mounted with the other stores to hand.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Approach

6. Practise the squad in the IA for a Phase 1 stoppage.

7. State the aim of all stoppages lessons, (*see* Introductory notes, para 1).

Phase 1

8. Load the gun and press the thumb-piece. Raise the rear cover and draw back the lock slowly. Tell the squad that the cause of a Phase 1 stoppage is a weak charge which does not drive the recoiling portions fully to the rear. Consequently the extractor is not able to drop as the horns do not clear the cams. When the lock begins its forward movement, the horns foul the steps of the cams. The IA remedies this by completing the backward movement and allowing the extractor to drop.

Phase 2

9. Practise the squad in the IA for a Phase 2 stoppage.

10. Tell them that in this phase the extractor is not dropping due to a slow backward movement of the recoiling portions. The horns are therefore constantly fouling the cams. This slow backward movement may be caused by:—

(a) Too much weight on the fusee spring.
(b) Grit, or lack of oil in the working parts.
(c) Excessive packing.
(d) Worn barrel.
(e) Tight pockets.
(f) Friction due to frozen oil or water.

Explain that the IA remedies the stoppage as in Phase 1 and prevents it recurring by giving a faster backward movement. But stress that the stoppage is really due to bad maintenance.

Phase 3

11. Practise the squad in the IA for a Phase 3 stoppage.

12. Tell the squad that this stoppage is caused by a weak or broken gib spring, which allows the cartridge to slide down the face of the extractor. When the lock moves forward, the bullet strikes the barrel block. A new lock will obviously remedy this stoppage.

Conclusion

13. Questions to and from the squad.
14. Further practice in IA for backward men.
15. Sum up main points.

LESSON 31.—CAUSES OF THE SECOND POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated on the right side of the gun with the instructor on the left of the gun and facing the squad.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, covering for crank handle and landscape or natural target.

4. The following prepared rounds are required:—
One separated case.
One telescoped round.
One damaged round.

Preparation

5. Gun mounted with the other stores to hand.

B CONDUCT OF LESSON

Preliminaries

6. Safety precautions.

Phase 1

7. Practise the squad in the IA for a Phase 1 stoppage.

8. Set up the gun for a Phase 1 stoppage and, as the crank handle is going forward the second time, explain that there is a damaged round on the face of the extractor which will not enter the breech. The position in which the crank handle will stop depends on which portion of the round is damaged. The IA remedies the stoppage by the removal of the damaged round.

Phase 2

9. Practise the squad in the IA for a Phase 2 stoppage.

10. Set up the gun and tell the squad that the front portion of the previous case has been left in the chamber. Consequently the live round cannot enter

the breech fully. When the live round is withdrawn, the separated case is telescoped over its nose. The IA remedies the stoppage by the removal of the telescoped round.

Phase 3

11. Practise the squad in the IA for a Phase 3 stoppage.

12. Set up the gun and explain that the cause of this stoppage is the same as in Phase 2, but that in this case the separated case remains in the chamber. The clearing plug will remove the separated case by expanding and gripping it firmly, thus remedying the stoppage.

Phase 4

13. Practise the squad in the IA for a Phase 4 stoppage.

14. Explain that a series of separated cases is caused by ineffective sealing of the breech. There is wear somewhere between the face of the extractor and the connecting rod, and as a result the lock does not go fully forward. When the round is fired, the cartridge case breaks and leaves a portion in the breech. A No. 1 and No. 2 washer placed on the connecting rod will close the breech properly and prevent a recurrence. State that at the first opportunity, the washers will be placed behind the adjusting nut.

Conclusion

15. Questions to and from the squad.
16. Further practice in IA for backward men.
17. Sum up main points.

LESSON 32.—CAUSES OF THIRD POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated on the right side of the gun with the instructor on the left of the gun and facing the squad.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, covering for crank handle and landscape or natural target.

4. One prepared round, a thick rimmed drill cartridge, is required.

Preparation

5. Gun mounted with the other stores to hand.

B CONDUCT OF LESSON

Preliminaries

6. Safety precautions should be carried out.

Phase 1

7. Practise the squad in the IA for a Phase 1 stoppage.

8. Set up the gun and raise the rear cover. Show the squad that a cartridge has been fed up slightly crosswise. Thus the base of the cartridge is not

in line with the extractor grooves. The extractor has not been able to rise to its highest position as it has fouled the rim of the cartridge instead of accepting it smoothly in the grooves.

By easing the pressure on the lock and pulling the belt, the IA straightens the round and the crank handle can thus be knocked on to the check lever.

Phase 2

9. Practise the squad in the IA for a Phase 2 stoppage.

10. Tell the squad that grit or lack of oil may cause friction in the lock. There is not sufficient momentum in the lock during the latter part of its forward movement to overcome this friction and consequently the extractor cannot rise to its highest position. Oiling will prevent a recurrence.

Phase 3

11. Practise the squad in the IA for a Phase 3 stoppage.

12. Set up the gun and show the squad that the base of a cartridge has fouled the mouth of the feedblock. When the slide started to move inwards, the top pawls were unable to carry the round into the feedblock. This is why the slide is out and the pawls rigid. State that the cartridge fouling the mouth of the feedblock may be due to:—

(a) Loose pockets.

(b) Liner not in line with the feedblock.

The IA releases the strain on the belt and enables the rounds to be straightened. Attention to points during firing will prevent a recurrence.

Phase 4

13. Practise the squad in the IA for a Phase 4 stoppage.

14. Set up the gun and raise the rear cover.

Explain that either the cartridge in the feedblock or the one on the face of the lock has a rim which is too thick to ride through the grooves of the extractor. Therefore the extractor cannot rise to its highest position and jams on the thick rimmed cartridge.

The IA remedies this stoppage by releasing the extractor and allowing the removal of the thick rimmed cartridge.

Conclusion

15. Questions to and from the squad.

16. Further practise in IA for backward men.

17. Sum up main points.

Lesson 33.—CAUSES OF THE FOURTH POSITION STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated on the right of the gun with the instructor on the left of the gun and facing the squad.

Periods

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, covering for the crank handle and landscape or natural target.

Preparation

4. Gun mounted with the other stores to hand.

B CONDUCT OF LESSON

Preliminaries

5. Safety precautions.

Phase 1

6. Practise the squad in the IA for a Phase 1 stoppage.

7. State that the cartridge in the breech is not fired owing to a misfire. Alternatively an empty pocket in the belt, which will result in an empty breech, may cause this stoppage.

Phase 2

8. Practise the squad in the IA for a Phase 2 stoppage.

9. Tell the squad that the cap of the cartridge is not struck due to a broken or damaged firing pin or a broken lock spring.

Phase 3

10. Practise the squad in the IA for a Phase 3 stoppage.

1. State that a recurrence of Phase 1 stoppages is caused by play between the extractor face and the base of the round. As a result the cap of the cartridge is not struck sufficiently hard to fire the round. A No. 1 and No. 2 washer placed on the connecting rod will take up the play and remedy this.

Conclusion

12. Questions to and from the squad.

13. Further practice in IA for backward men.

14. Sum up main points.

Lesson 34.—CAUSES OF SPECIAL STOPPAGES

A INSTRUCTOR'S NOTES

Class and instructors

1. Squads under squad instructors. Squad seated on the right of the gun with the instructor on the left of the gun and facing the squad.

Period

2. One 45-minute period.

Stores

3. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, covering for the crank handle, landscape or natural target and skeleton lock.

4. Two prepared thick rimmed drill cartridges are also required.

Preparation

5. Gun mounted with the other stores to hand.

B CONDUCT OF LESSON

Preliminaries

6. Safety precautions.

Special A

7. Exercise the squad in the IA for a Special A stoppage.

8. State that the cause of this stoppage is that either the fusee or fusee spring is broken; hence the lock and crank handle will remain fully to the rear, because there is no force to draw them forward.

Special B

9. Practise the squad in the IA for a Special B stoppage.

10. Explain that this stoppage may be caused by either:—

(a) Damaged extractor grooves, which will not accept the base of the cartridge in the feedblock, or

(b) Broken gib or gib spring, which will not allow the upper projection of the gib to be depressed.

Both of these causes will result in the extractor jamming against the base of the cartridge in the feedblock and being unable to rise to its highest position. A change of lock will obviously remedy this.

Special C

11. Practise the squad in the IA for a Special C stoppage.

12. State that this stoppage is due to damage to any of the following parts of the feedblock:—

(a) Upper lever. *(b)* Lower lever.
(c) Top pawls or spring. *(d)* Bottom pawls or spring.

Damage to *(a)*, *(b)* or *(c)* would result in the cartridges not being fed into the feedblock. Damage to *(d)* would mean that when the top pawls move to the right, the belt would slip back out of the feedblock.

The gun fires two rounds before stopping as there are two rounds on the face of the extractor.

Special D

13. Practise the squad in the IA for a Special D stoppage *ie*, " Runaway Gun."

14. State that a " runaway gun " is caused either by:—

(a) Broken or worn nose of the trigger and bent of the tumbler, or

(b) The short arm of the lock spring being broken above the trigger axis pin.

15. Using the skeleton lock, show that either of these will result in the nose of the trigger not engaging in the bent of the tumbler. Consequently, even though pressure is released from the thumb-piece, directly the lock goes forward and the side levers head depresses the tail of the sear, the firing pin will fly forward and fire the round in the breech.

Conclusion

16. Questions to and from the squad on the causes of any position stoppage.

17. Sum up main points.

CHAPTER 8

INSTRUMENTS AND AIMING

LESSON 35.—THE SIGHTS, AIMING AND LOADING

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier how to load and unload the gun correctly.

2. To teach the soldier to adjust the tangent sight to the range ordered and to lay a correct aim.

3. To teach the use of the battle sight.

Class and instructors

4. Squads under squad instructors, seated on the right side of the gun.

Periods

5. One 45-minute period.

Stores

6. Gun, tripod, condenser can and tube, liner with belt and drill cartridges, landscape or natural targets.

Preparation

7. Gun mounted with the landscape target set up in front of the gun.

B CONDUCT OF LESSON

Preliminaries

8. Safety precautions.

Approach

9. Give the aim of the lesson (*see* para 1).

10. Detail a No. 2, the instructor acting as No. 1, order " **Take Post.**"

Loading the gun

11. Explain and demonstrate that on the order " **Load** " the No. 2 will grasp the end of the belt with the right hand at the point where the tag joins the fabric, and push the tag through the feedblock as far as possible. The No. 2 must ensure that the belt is not twisted on entering the feedblock.

12. Exercise No. 2.

13. Explain and demonstrate that on the order " **Load** " the No. 1 will pull the crank-handle on to the roller with the right hand and advance the left hand to the left of the feedblock, ready to grasp the belt. When the No. 2 has passed the tag of the belt through the feedblock, the No. 1 will grasp it and pull it through the feedblock as far as possible; he must pull the belt gently and straight when doing so. He will release the crank handle and then repeat the movements.

Emphasize that while pulling the crank handle on to the roller the belt will be held but not pulled. Stress the importance of pulling the belt gently and straight; any snatching of the belt or pulling to the rear will result in faulty loading.

Unloading the gun

14. Tell the squad that on the order "**Unload**" the No. 2 will withdraw the belt from the feedblock when the No. 1 has pressed the pawls. He will then replace the belt in the liner.

15. Explain and demonstrate that on the order "**Unload**" the No. 1 will pull the crank handle on to the roller twice with the right hand, allowing it to fly forward each time, retaining correct holding with the left hand on the traversing handle. He will then press the top pawls of the feedblock down with the first and second fingers of the right hand, and lift the bottom pawls with the thumb of the right hand, taking care to keep the entrance to the feedblock clear. When the last round is clear of the feedblock, and while the belt is being withdrawn he will press the thumb-piece.

16. State that if when the order "**Unload**" is given, the tangent sight is raised the No. 1 will knock it down with his left hand.

Practice

17. Practise the squad in loading and unloading the gun. Should any man show a tendency to slur the loading motions, the instructor should make him load by numbers, counting aloud whilst he is so doing.

THE SIGHTS AND AIMING

Approach

18. State the aim of the lesson (*see* paras 2 and 3).

Tell the squad that the sights are used in direct fire to obtain direction and elevation.

Adjusting the tangent sight

19. Point out that the sight is graduated from zero to 3,700 yards. The correct line on the graduated plate for any particular range is the one *under* the figures indicating that range. The sight can be set to 50-yard intervals by eye.

20. Demonstrate adjusting the sights, then practise the squad, each man making several adjustments.

Aiming with the tangent sight

21. State that the method of laying an aim with the machine gun is very similar to the rifle.

The rule of aiming is:—

Close either eye; look through the aperture at the target and select the point of aim. Look at the tip of the foresight and bring it up to the point of aim, keeping the point of aim in the centre of the aperture. The sights must be upright, which is ensured by the correct mounting of the tripod.

Note.—The point of aim on a target when firing the machine gun, is the centre of the base, unless otherwise ordered by the Fire Controller.

Laying a correct aim

22. The instructor will now lay a correct aim on the landscape target and explain and demonstrate that whilst laying an aim, direction is obtained by tapping the traversing handles and elevation by means of the elevating handwheel. Whenever either tapping or elevating the gun, the disengaged hand *must* retain correct holding.

Practise

23. Let each man in the squad view the correct aim and then, in turn, lay the gun himself. Should any faults be detected, the instructor must explain their effect, and see that they are remedied. If a man's aim is incorrect the instructor must convince him that it is so and persevere until he can lay a correct aim.

24. Further practice should then follow on natural targets.

Noting a point of aim

25. State that when allowing for wind it will often be necessary to note a point of aim to the right or left of a target. Lay an aim on a target, tap the gun off and ask the squad to describe where the gun is laid.

Battle sight

26. Point out the battle sight and tell the squad that this sight is used in emergency at ranges up to 600 yards.

Conclusion

27. Questions from the squad.

28. Further practice for backward men.

29. Sum up main points.

LESSON 36.—DIAL SIGHT

A INSTRUCTOR'S NOTES

Aim

1. To explain the parts of the dial sight and their working to the soldier.

Class and instructors

2. Squads under squad instructors. Squad seated in a semi-circle.

Periods

3. One 45-minute period.

Stores

4. Gun and tripod, wall diagram of the dial sight and as many dial sights as possible.

B CONDUCT OF LESSON

Approach

5. State the aim of the lesson (*see* para 1). Tell the squad that the dial sight is an instrument which is used to obtain and maintain direction and elevation in indirect fire or whenever the target cannot be seen from the gun position.

6. The class should have dial sights in their hands and follow the description and actions of the instructor.

Method of fixing to the gun

7. Demonstrate that the tapered bracket on the sight fits into the slot on the bracket on the gun. The sight is clamped tight by the fixing screw.

Elevation

8. State that elevation is placed on the dial sight by means of the range and angle of sight drums used in conjunction with the level bubble. Describe these drums. The main features to note are:—

(a) The range drum is graduated in 100s of yards up to 4,500 yards. Up to 400 yards one click represents 100 yards—over 400 yards one click represents 50 yards. Forward of the drum is a quick release lever which disconnects the clicker ring. This quick release should always be used when initially setting the range drum, to avoid wear.

(b) The angle of sight drum is graduated in 5s of minutes to 10 degrees of elevation and depression. The drum is fitted with a friction clamp.

(c) The fitting for the spare level bubble.

9. Practise the squad in setting the drums.

Direction

10. Tell the squad that direction is placed on the sight by the dial and deflection drums. The main features to describe are:—

(a) The dial is marked in 10s of degrees from 0 to 180 degrees left and right. There is a quick release stud forward of the dial.

(b) The right and left deflection drums are marked in 10s of minutes from zero to ten degrees.

(c) The adjustable clicker lever and its arrows.

(d) The freewheeling and clicking of the deflection drums are controlled

11. Practise the squad in setting the dial and deflection drums, and then replacing them at zero, by first putting the deflection drums at zero and then the dial.

Lensatic sight

12. State that the lensatic sight enables the No. 1 to lay an aim on a mark without altering the setting of the deflection drums or elevation drums. It is principally used for maintaining direction.

13. Describe the following points regarding the lensatic sight:—

(a) Point out that the tube may contain either a white triangle or a vertical white line.

(b) How the lensatic sight is adjusted vertically by the lensatic sight adjusting screw (marked cursor screw on Plate 3).

(c) How to zero the lensatic sight by means of the zero latch and how to free wheel it by means of the quick release.

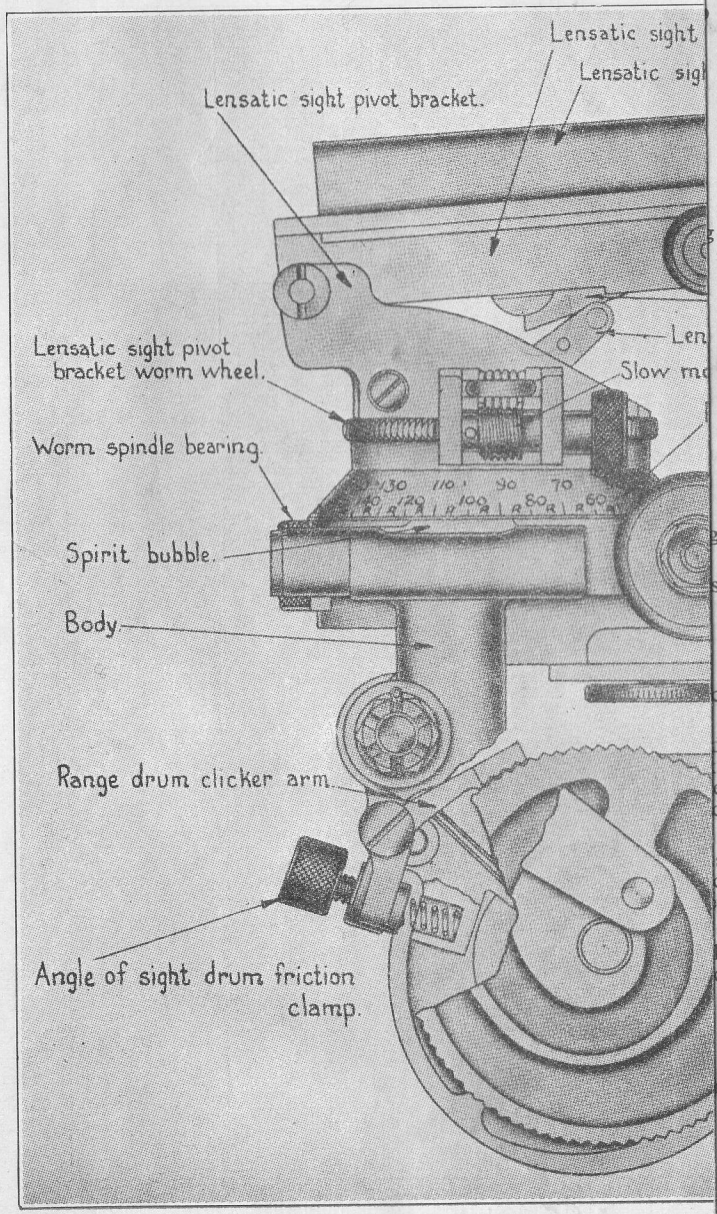
(d) The operation of the fine adjustment worm.

14. Practise the squad in releasing and zeroing the lensatic sight.

Conclusion

15. Questions to and from the squad.

16. Sum up main points.



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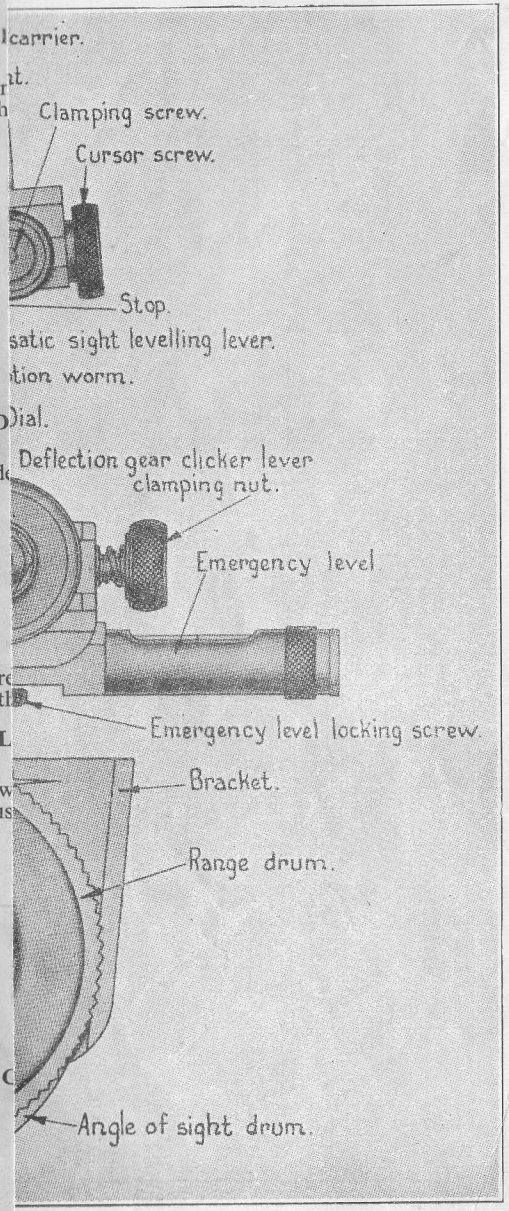


LESSON 37.—AIMING POST, AIMING LAMP, ZERO POST AND DIRECTION DIAL

A INSTRUCTOR'S NOTES

Aim

1. To familiarize the soldier with the instruments named above.
2. To teach the method of setting up the aiming post and lamp.
3. To teach the setting of the direction dial.

Class and instructors

4. Squads under squad instructors. Squad seated in a semi-circle facing the instructor.

Periods

5. One 45-minute period.

Stores

6. Aiming post, aiming lamp, zero post, gun and tripod.

B CONDUCT OF LESSON

Approach

7. State the aims of the lesson (*see* paras 1, 2 and 3 above).

Aiming post

8. Describe the aiming post pointing out the adjustable arm, aiming mark, bracket for lamp and the supporting extension.

9. Demonstrate how to erect the aiming post vertically and lying on its side.

10. Practise the squad.

Aiming lamp

11. Describe the components of the lamp. Point out the coloured disc for toning down the light.

12. Show how to attach the lamp to the aiming post. The lamp is removed from the box and the cable passed through the slot in the side of the box. The lamp is secured to the extension above the aiming mark, with the bracket uppermost, by tightening the wing nut. The box is then closed and placed close to the aiming post with the ring facing the guns.

13. Demonstrate how to secure the box. On soft ground, the hook is released from its securing strap and stamped into the ground. On hard ground, the securing chain is used to anchor the box to a post or other firm object, but never to the aiming post.

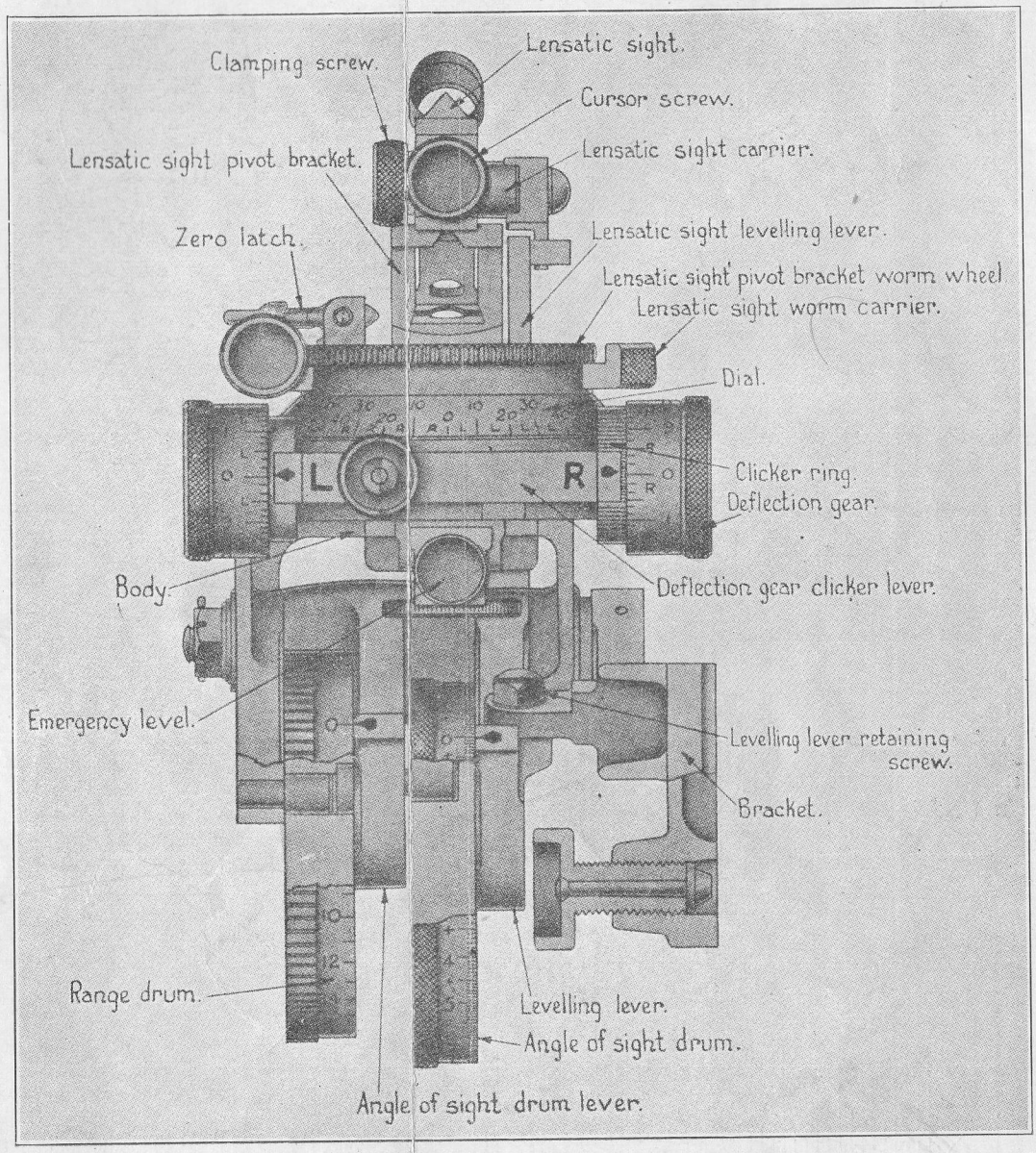
14. Show how the reel is removed from the box and the swivel hook clipped through the switch ring. Demonstrate how to switch the light on and off by pulling on the line.

15. Practise the squad.

Zero post

16. Show the zero post to the squad and tell them that it is used in obtaining direction in indirect fire.

PLATE 3—Continued



DIAL SIGHT

PLATE 3

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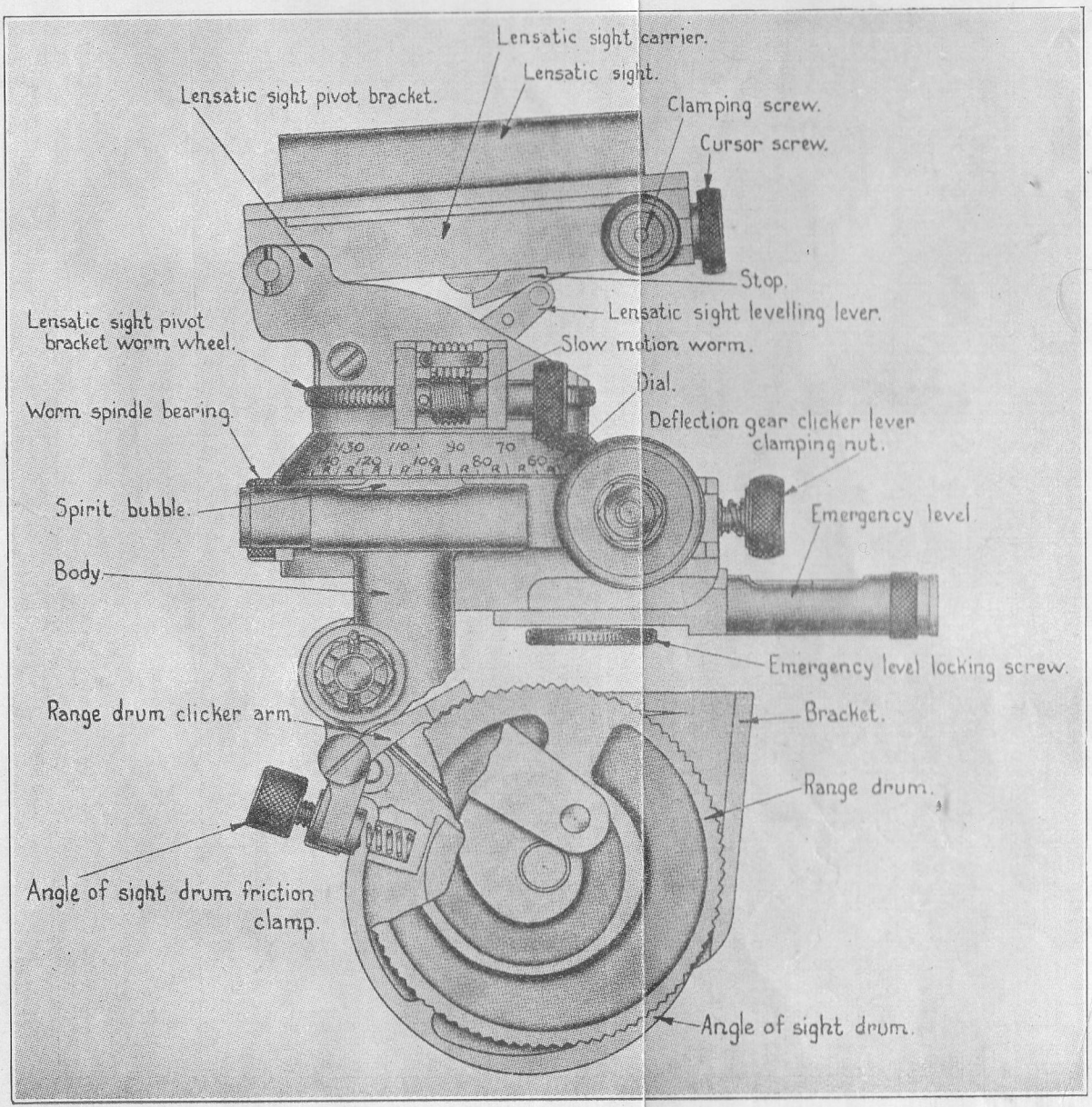

Direction dial

17. Point out that the direction dial is graduated from 0 to 180 degrees right and left. Show how the scale can be rotated round the socket and can be fixed in any position by a clamping screw. Indicate the pointer to the squad.

18. State that the direction dial is used as a check in maintaining direction. No. 2 is responsible for setting it.

19. Practise the squad in setting the direction dial.

Conclusion

20. Questions to and from the squad.

21. Sum up main points.

LESSON 38.—AIMING WITH THE DIAL SIGHT BY DAY

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier to lay an aim with the dial sight by day.

Class and instructors

2. Squads under squad instructors. Squad seated in a semi-circle on the right of the gun.

Periods

3. One 45-minute period.

Stores

4. Two guns, tripods and dial sights, aiming post, aiming lamp, two zero posts, a direction peg and landscape or natural targets.

Preparation

5. The two guns should be mounted about 15 yards apart, with dial sights attached and all drums and dials at zero. The aiming post should be placed centrally between and 15 yards out from the guns.

B CONDUCT OF LESSON

Approach

6. State the aim of the lesson.

Aiming by day

7. Explain how to aim with the lensatic sight containing a triangle. The eye should be about three inches from the sight. By moving the head backwards or forwards, the white triangle can be made to fit the tube exactly. The tip of the triangle can now be aligned on the aiming mark.

8. Explain how to aim with the lensatic sight containing a line. The eye should be about three inches from the sight. By moving the head backwards or forwards, the vertical line can be made to touch the top and bottom of the tube, and should be down the centre. The line can now be aligned on the aiming mark.

9. Demonstrate aims laid on the following types of aiming marks and practise the squad in each case:—

(a) Two zero posts, by having the sight set at zero, and moving the gun and tripod, until the lensatic sight and two posts are in line.

(b) The aiming post, by freewheeling the lensatic sight until it is aimed at the white disc.

(c) The aiming lamp, when fitted on the aiming post, by freewheeling the lensatic sight until it is aimed at the black aiming mark.

(d) The zero post, direction peg and lamp, by having the sight set at zero, and moving the gun and tripod, until the sight, the zero post and the lamp, which is held immediately behind the direction peg, are in line.

(e) The lensatic sight of another gun, by having a switch of about 90 degrees on the sight and tapping the gun until the lensatic sights are aimed at each other.

(f) Landscape or natural targets, by freewheeling the lensatic sight until it is aimed at the natural target.

Conclusion

10. Questions from the squad.

11. Further practice if necessary.

LESSON 39.—AIMING WITH THE DIAL SIGHT BY NIGHT

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier to lay an aim with the dial sight by night.

Class and instructors

2. Squads under squad instructors. Squad seated in a semi-circle around the gun.

Periods

3. One 45-minute period, (day or night).

Stores

4. Gun, tripod, dial sight, aiming post, aiming lamp, zero post, direction peg, and lamp, electric.

Preparation

5. The gun should be mounted and the dial sight attached with all drums and dials at zero. The aiming post should be placed out. The zero post and direction peg should be lined up ready for use, and the aiming lamp held behind the peg when required.

Ground

6. This lesson is best conducted in a dark room or shed which can be illuminated when necessary to show faults. The room must have a floor suitable for planting the zero post and direction peg. If no such room is available, then the lesson must be taught outdoors by night.

B CONDUCT OF LESSON

Approach

7. State the aim of the lesson (*see* para 1).

Aiming by night

8. Explain that the method of aiming with the dial sight is the same as by day, except that it may be necessary to assist the No. 1 by shining a torch at an angle into the front of the lensatic sight.

9. Demonstrate and practise the squad laying an aim on:—
   (a) Zero post, direction peg and aiming lamp.
   (b) Aiming lamp, when attached to the aiming post.

Conclusion

10. Questions from the squad.

11. Further practice at aiming at night is essential.

LESSON 40.—PARALLELING WITH THE DIAL SIGHT

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier how to handle the dial sight when the guns are being paralleled.

Class and instructors

2. Squads under squad instructors. Squad in a semi-circle around No. 2 gun.

Periods

3. One 45-minute period.

Stores

4. Two guns, tripods and dial sights and an aiming post.

Preparation

5. Guns mounted about 15 yards apart with dial sights attached. The aiming post should be planted 15 yards in front and centrally between the two guns.

B CONDUCT OF LESSON

Approach

6. State the aim of the lesson. Tell the squad that the right hand gun represents No. 1 gun, the left hand gun No. 2 gun, and that Nos. 3 and 4 guns would be to the left again.

Zero lines

7. Explain that on the order "**Zero Lines,**" the No. 1 will ensure that all deflection drums and dials are at zero.

Paralleling

8. Describe and demonstrate the duties of No. 1 and No. 2 on the order "**No. 2 gun, Left . . . . . degrees . . . . . minutes.**" The No. 1 will set the dial and deflection drums as ordered. He will tap the gun, elevating or depressing the lensatic sight, until it is laid on the lensatic sight of No. 1 gun. The No. 1 of No. 2 gun will then zero the deflection drums and dial again and by pressing the quick release, adjust the lensatic sight until it is laid on the aiming post. The No. 2 will then zero the direction dial.

9. Practise the squad in the duties of No. 1 and No. 2.

Action on the order "Stop."

10. State that on the order "**Stop**" or at any time when checking for direction, the gun will be tapped until direction is obtained on the aiming post.

11. Practise the squad.

Conclusion

12. Questions from the squad.

13. Further practice for backward men.

14. Sum up main points. Stress that, when once the guns are paralleled and the lensatic sight laid on the aiming post, the lensatic sight must never be moved for direction. To obtain direction, the gun must always be tapped.

LESSON 41.—ELEVATION WITH THE DIAL SIGHT

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier to place elevation on the gun by means of the dial sight.

Class and instructors

2. Squads under squad instructors. Squad seated on the left of the gun.

Periods

3. One 45-minute period.

Stores

4. Gun, tripod, dial sight and aiming post.

Preparation

5. The gun mounted with the dial sight attached and all drums and dials at zero. The aiming post should be put out and the lensatic sight laid on to it.

B CONDUCT OF LESSON

Revision

6. Revise briefly Lessons 40 and 36.

Approach

7. State the aim of the lesson (*see* para 1 above). Explain that it is assumed that the gun is now laid for direction.

Elevation

8. Tell the squad that orders in range will be given to the nearest 50 yards and orders in angle of sight to the nearest 5 minutes, *eg*, "**All one nine fifty, plus two five minutes.**" "**All one eight hundred, minus one five minutes.**"

9. Demonstrate that, on a range and angle of sight being ordered, the No. 1 will place them on the elevation drums, tighten the angle of sight drum clamping screw and level the bubble by means of the handwheel. Stress that when levelling the bubble, the No. 1 will retain his holding with his left hand. Finally, the lensatic sight will be readjusted for elevation on to the aiming post.

10. Practise the squad.
Action on order "**Stop.**"

11. Explain and demonstrate that on order "**Stop**" or when checking for elevation during firing the No. 1 will first tap the gun until direction is obtained on the aiming post and then check and if necessary correct:—

(a) Elevation drums.

(b) Level of the bubble.

(c) Alignment of the lensatic sight.

in that order.

12. Practise the squad.

Conclusion

13. Questions from the squad.

14. Further practice in elevation and direction with the dialsight.

15. Sum up main points. Emphasize that accuracy with the dial sight is essential if the guns are to hit the target in indirect fire.

LESSON 42.—RECORDING THE QUADRANT ELEVATION AND MEASURING AN ANGLE OF SIGHT

A INSTRUCTOR'S NOTES

Aim

1. To teach the soldier to record the quadrant elevation of the gun.

2. To teach the soldier how to measure an angle of sight with the dial sight.

Class and instructors

3. Squads under squad instructors. Squad in a semi-circle on the left of the gun.

Periods

4. One 45-minute period.

Stores

5. Gun and tripod, dial sight and landscape or natural targets.

Preparation

6. Gun mounted with the other stores to hand.

B CONDUCT OF LESSON

Approach

7. State the aim of the lesson (*see* paras 1 and 2).

Recording the QE

8. Tell the squad that in a direct fire position, the fire controller may want to record the quadrant elevation that is on the gun. Such occasions are when darkness, fog or smoke are likely to obscure the target or when preparing to lay a fixed line.

9. Lay the gun on a target with a suitable range on the tangent sight. Demonstrate that, when he is ordered to record the QE, the No. 1 will first check his aim. He will then attach the dial sight, transfer the range on the tangent sight to the range drum and level the bubble by means of the angle of sight drum, and tighten the clamping screw. The two drums will now record the quadrant elevation required to hit the target.

10. Practise the squad in recording the QE.

Measuring an angle of sight

11. Tell the squad that, in an indirect position, the section commander may order the No. 1 to measure the angle of sight to the crest. The section commander requires this in order to ascertain if the guns will clear the crest.

12. Demonstrate that the No. 1 will place the dial sight on the gun and, with the tangent sight at zero, lay the gun by direct means on the point indicated. Then, with the range drum at zero, the No. 1 will level the bubble by means of the angle of sight drum and report the reading which is the angle of sight to the object.

13. Practise the squad in measuring angles of sight.

Conclusion

14. Questions from the squad.

15. Further practice as required.

16. Sum up main points.

LESSON 43.—THE DIRECTOR No. 9, MARK 1

A INSTRUCTOR'S NOTES

Aim

1. To teach the officer or NCO to set up and use the director.

Class and instructors

2. This lesson will only be taught to officers and NCOs. Squads should preferably be of not more than eight. The squad should be seated in a semi-circle.

Periods

3. Two 45-minute periods.

Stores

4. As many directors and stands as available.

B CONDUCT OF LESSON

Approach

5 State the aim of the lesson (*see* para 1), and tell the squad that the director is an instrument used in indirect fire for measuring vertical and lateral angles.

The instrument

6. Point out that the instrument consists of a body and a telescope. The telescope has graticules marked in 10 minutes, measuring up to 5 degrees above and below the centre of a central vertical hair line. There is no focussing. (In a later pattern the angle of sight graticules measure up to 4 degrees only). On top of the telescope is the level bubble which is a fixture with the telescope, and the levelling screw. The action of the latter is to bring the bubble central by bringing the telescope level. Below the levelling screw and on top of the body is the director level by which it can be ensured that the director is upright. At the bottom of the body is the dial which measures 0 to 180 degrees right and left, and which is normally set at zero. In front of the body are the deflection drums which enable the director to be turned about the dial. The angle of deflection is measured to 5 degrees on the dial, and in degrees and minutes by the appropriate deflection drum. Each deflection drum and dial has its own pointer. Between the deflection drums is a quick release, which, by being depressed, enables the director to be turned about the dial without the use of the deflection drums. Below the body is a socket, by which the director is attached to a pivot on the stand. When attached, the director complete can be turned about the pivot, or clamped in the required position by means of the clamping nut. Without altering the settings on the direction dial and deflection drums fine adjustments in direction can be made with the fine adjustment screw, below the right deflection drum. The two pointers alongside indicate when this is central, as it should be when the director is first set up.

7. Question the squad on the instrument.

The stand

8. Show that the legs are adjustable. Point out the pivot, the universal joint and its clamping screw. State that the protecting cap must always be screwed on when the director is not in use.

Setting up the director

9. Demonstrate how to set up the director. Undo the strap holding the legs together. By loosening the milled headed screws extend the legs as necessary and tighten up the screws. Splay out the legs and mount the stand, with pivot at convenient height and approximately upright. If necessary tighten butterfly nuts. Press the legs firmly into the ground. Remove pivot protector and attach director. Ensure that fine adjustment screw is central. Loosen the universal joint clamping screw and centralize director level bubble. Tighten universal joint clamping screw. Hang the case over the stand.

10. Practise the squad in setting up their directors.

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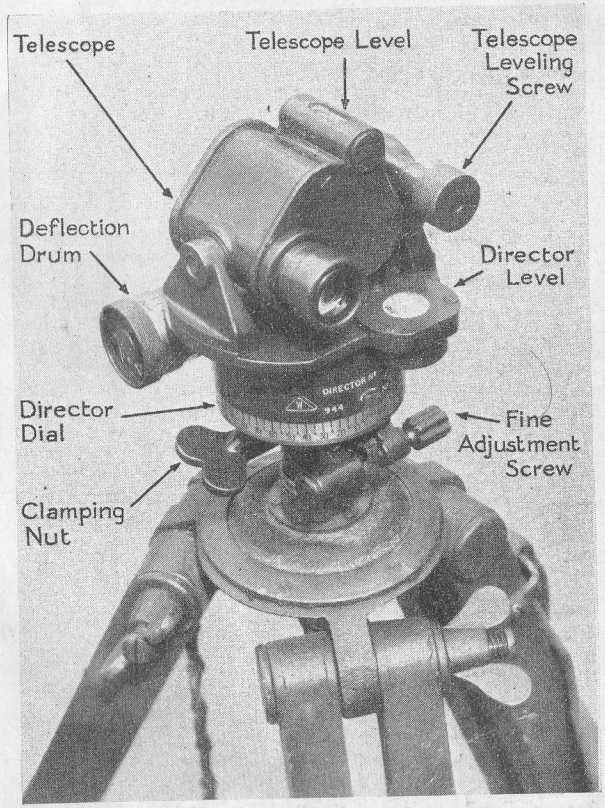
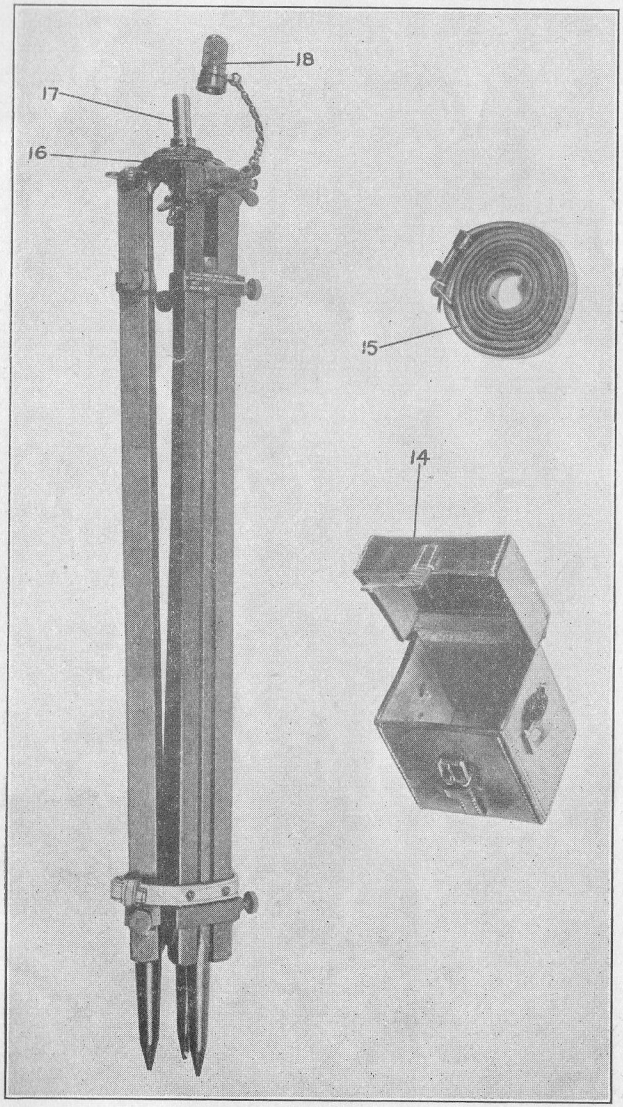
PLATE 4



Director No. 9

PLATE 5



Stand Instrument No. 28, Mark I

14. Leather case.
15. Shoulder strap.
16. Base plate.
17. Ball joint.
18. Protecting cap.

To take an angle of sight (normal)

11. Explain and demonstrate that the telescope is aligned on to the target, and the clamping nut tightened. The bubble is then levelled. By looking through the telescope the angle of sight can be read from the graticules. Stress that readings must be to the nearest five minutes and that the bubbles must be central.

12. Practise the squad on various targets.

To take an angle of sight of more than 5 degrees. (Or of more than 4 degrees, on the later pattern director).

13. State that if the angle of sight is more than 5 degrees, the director is laid at a convenient point above or below the target and the angle of sight to this point noted. The vertical angle between this point and the target is then measured with the graticules by means of the leveling screw. The sum of the two angles will give the angle of sight to the target.

14. Practise the squad.

To measure a vertical angle

15. To measure the vertical angle between two objects. Using the levelling screw, put the zero graticule on one of the objects, and from the scale read the angular measurement to the second object.

16. Practise the squad.

To measure the lateral angle between two points

17. Demonstrate that the dial and deflection drum are set at zero, and the fine adjustment pointers opposite each other. The clamping nut is loosened and the director laid approximately at the first point. The dial and drums should still be at zero. The clamping nut is now tightened and the hair line brought accurately on to the first point by means of the fine adjustment screw. Then using the deflection drums, the hairline is swung on to the second point. The angle can now be read in degrees off the dial and in degrees and minutes off the appropriate deflection drum. Stress that readings must be as accurate as possible and that care must be taken not to read off the wrong deflection drum. State that before the director is returned to its case all drums must be at zero and the fine adjustment screw centralized.

18. Practise the squad in measuring switches.

Conclusion

19. Questions from the squad.

20. Further practice as required.

21. Sum up main points in the use of the director.

LESSON 44.—THE RESECTOR PROTRACTOR

A INSTRUCTOR'S NOTES

Aim

1. To teach the officer or NCO to determine the position of the pivot gun on the map by means of the resector protractor.

Class and instructors

2. This lesson will be taught to officers and NCOs only. Squads should be of not more than eight.

Periods

3. Two 45-minute periods, partly indoors and partly outdoors. This lesson should be taught normally just before lesson 116.

Stores

4. One resector protractor, map and mapboard per student. One director for every two students.

Preparation

5. The instructor must select a suitable position for the pivot gun beforehand.

Equipment

6. Squad will require notebooks and sharp pencils.

B CONDUCT OF LESSON

Approach

7. State the aim of the lesson (*see* para 1 above).

Resector protractor

8. Describe the instrument. The squad should follow the instructor's description with their instruments. The resector protractor consists of:—

(a) A protractor graduated from left to right and from right to left in degrees, and containing romers for scales of 1/20000, 1/25000, and 1/63360. It has three pin holes drilled in it.

(b) A fixed arm containing graduations in hundreds of yards for a scale of 1/25000, a scale of angles of sight in minutes and two pin holes. One edge of the arm is bevelled.

(c) A lower pivoting arm with graduations in hundreds of yards for a scale of 1/10000, a scale of angles of sight in minutes and two pin holes. The arm is continued on the opposite side of the pivot in the form of a tail. One edge of the arm is bevelled.

(d) An upper pivoting arm with two pinholes, one bevelled edge and a tail on the opposite side of the pivot. The arm has a scale of 1/63360.

(e) A clamping screw with pencil hole.

Obtaining data

9. Move the squad to the site selected for the pivot gun and erect the director over the spot. (G in Fig 3).

10. State that three objects on the ground, with well defined edges, and which can be identified on the map, should be selected.

For the best results these objects should be as far away as possible and spaced fairly equally around the point G. (In the diagram these points are referred to as A, B and C).

11. Explain and demonstrate that the director is then laid on A with its drums and dials at zero. From A, the switches to B and C should be measured and noted, (angles X and Y in the diagram). The same ends of the objects should be used, *ie*, all right ends or all left ends.

12. Practise the squad.

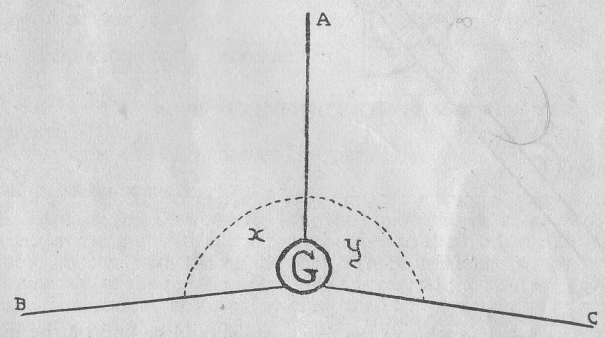


FIG 3

Resecting the position

13. Move the squad indoors.

14. Explain and demonstrate how to resect a position:—

(a) Take the resector and with all arms closed, hold it so that they are pointing away and release the clamping screw.

(b) Move the lower pivoting arm in an anti-clockwise direction and using the inner scale of the protractor, set the bevelled edge at the angle X.

(c) Move the upper pivoting arm in a clock-wise direction using the hairline on the tail and the outer scale, set the arm at the angle Y. Taking care that the arms do not move, tighten the clamping screw.

(d) Lay out the map on a flat surface, removing all creases and folds. A small pencilled circle around each of the objects A, B and C will assist identification.

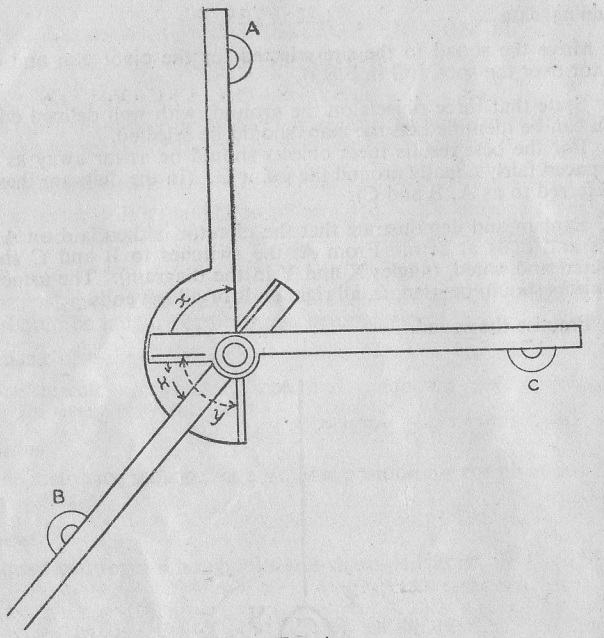


FIG 4

(e) The bevelled edge of the fixed arm should be laid on the left edge of A and then by moving the protractor about get the bevelled edges of the two pivoting arms over the left ends of B and C respectively as in Fig 4 above. Care must be taken that the eye is immediately above the bevelled edges when the resector is set.

(f) A sharp pencil through the hole in the clamping screw marks the position of No. 1 gun. The resector is removed and the mark circled in pencil.

(g) The accurate map references can be measured with a romer.

15. Practise the squad in resecting a position using the data obtained outdoors.

16. If time allows, practise the squad in the complete process of resecting a new pivot gun position.

Conclusion

17. Questions from the squad.

18. Sum up main points.

CHAPTER 9

INSTRUMENT TESTS

LESSON 45.—TESTING THE CLINOMETER

A INSTRUCTOR'S NOTES

Aim

1. To teach officers and NCOs how to ascertain if the clinometer is in adjustment.

Class and instructors

2. Squads under squad instructors. This lesson should only be taught to officers and NCOs.

Periods

3. This period will not normally take a full 45 minutes to teach.

Stores

4. Gun, tripod and clinometer.

B CONDUCT OF LESSON

Approach

5. State the aim of the lesson (*see* para 1).

Testing the clinometer

6. Explain and demonstrate that the clinometer is set at zero. It is then placed on the gun with the arrow pointing to the front of the gun and the bubble levelled with the handwheel. The clinometer is now reversed and the position of the bubble noted. If it is central the clinometer is in adjustment. This should, however, be confirmed by repeating the process with the clinometer set at 10 degrees elevation and 10 degrees depression. State that if the bubble is displaced in either test, it indicates that there is an error.

7. Demonstrate that if there is an error, the clinometer is left on the gun and the micrometer head is rotated until the bubble is central and the scale reading noted. This reading should now be halved and set on the scale, *eg*, if the scale had read 20 minutes elevation, it should be set at 10 minutes elevation. The clinometer should now be placed back on the gun and retested as before. If the bubble is still not central, it should again be brought central by means of the micrometer head and then the reading should be halved as before and the clinometer tested again until a reading is obtained at which the bubble is central with the clinometer facing in both directions. This reading is the amount by which the clinometer is out of adjustment.

8. Emphasize that any adjustment must be carried out by an armourer.

9. Practise the squad.

Conclusion

10. Questions to and from the squad.

11. Sum up main points.

LESSON 46.—TESTING AND ADJUSTING THE DIAL SIGHT

A INSTRUCTOR'S NOTES

Aim

1. To teach the officer or NCO how to test, and if allowed, to adjust the dial sight.

Class and instructors

2. Squads under squad instructors. This lesson should only be taught to officers and NCOs.

Period

3. One 45-minute period.

Stores

4. Gun, tripod, dial sight, clinometer, spare parts case and blackboard.

B CONDUCT OF LESSON

Approach

5. State the aim of the lesson (*see* para 1 above). Dial sights should be tested periodically for both elevation and direction. Whenever a new dial sight or gun is received, the dial sight should be tested.

Testing for elevation

6. State that a clinometer Vickers is required. This must first be tested for accuracy (*see* Lesson 45).

7. Demonstrate that the clinometer scale is set at zero, or, if out of adjustment, at the error discovered when tested. The dial sight is placed on the gun and clamped up; its drums and dials set at zero. The rear cover is then opened and the clinometer placed on the breech casing with the arrow pointing to the front of the gun. The gun is then elevated or depressed by the handwheel until the clinometer bubble is central. If the dial sight bubble is then level, the dial sight is in adjustment for the gun used. If it is not central, it should be brought so by the angle of sight drum. The dial sight is thus out of adjustment by plus or minus the amount shown on the angle of sight drum.

8. State that any error must be corrected by an armourer. Practise the squad in the drill of testing for elevation.

9. Tell the squad that if it is not possible to have the dial sight adjusted before firing, a label should be attached to it showing the amount of error. The amount of error now becomes the zero mark for this dial sight, *eg*, if the amount of error was plus 30 minutes the dial sight would only be at ' zero ' when the bubble was central and plus 30 minutes on the angle of sight drum. Corrections would now be put on as normal from this new ' zero ' mark.

10. Question the squad on off-setting errors in a dial sight which is out of adjustment.

Testing for direction

11. State that the lensatic sight should be zeroed for line on the thirty yards range at the same time as the lateral adjustment of the foresight is carried out.

12. Using a blackboard, explain that a thick line is drawn parallel to and 3.4 inches to the left of the thin line on which the shots would fall. If, when the MPI of the group fired falls on the thin line, the tip of the lensatic sight coincides with the thick line, the lensatic sight is in adjustment.

13. Tell the squad that as an alternative test without firing, the gun can be laid on a distant target with the tangent sight. Then if the lensatic sight also coincides with the target, it is in adjustment.

14. Demonstrate how to adjust the lensatic sight for direction. The screws below and to the side of the ramps are loosened. The appropriate screw is then tightened until the line of sight is 3.4 inches to the left of the barrel. The screw is then locked in position by tightening the opposite screw.

15. Question the squad on the method of testing and adjusting for direction. Opportunity can be taken to practise when firing on the 30-yards range.

Conclusion

16. Questions to and from the squad.

17. Sum up main points. Stress that a dial sight is only tested and adjusted when attached to its own guns.

LESSON 47.—TESTING THE DIRECTOR

A INSTRUCTOR'S NOTES

Aim

1. To teach officers and NCOs to test the director for accuracy in measuring an angle of sight.

Class and instructors

2. Squads under squad instructors. This lesson should only be taught to officers and NCOs.

Periods

3. One 45-minute period.

Stores

4. Gun, tripod, dial sight, chalk and as many directors as are available.

Ground

5. The ground selected for the lesson should have two upright walls or posts about 200 yards apart and on level ground.

B CONDUCT OF LESSON

Approach

6. State the aim of the lesson (*see* para 1). There are two methods of ascertaining if the director is in adjustment for measuring angles of sight — one which can be used in barracks or billets and one which can be used under active service conditions.

Method 1

7. Tell the squad that this method entails laying out a horizontal plane. A position must be chosen where there are two walls or upright posts about 200 yards apart and on fairly level ground. In the diagram below, the post A and the wall B have been chosen.

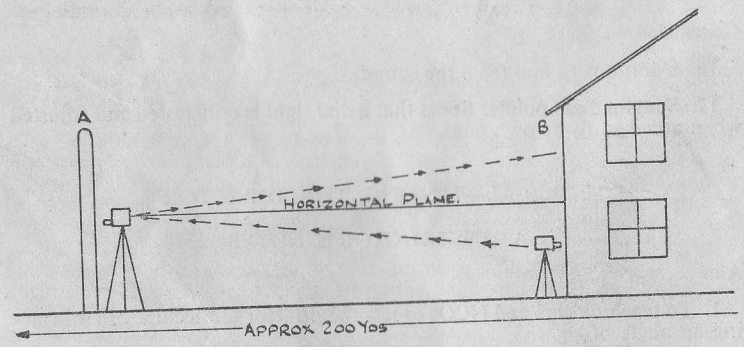


FIG 5

8. Demonstrate that the director is erected near the wall B and laid on the post A. With both bubbles level, a mark with chalk is made on the wall B level with the object glass. Instruct an assistant to make a mark on the post A where the zero line of the angle of sight cuts it.

Now move the director to the post A and erect it so that the object glass is level with the mark made by the assistant. With both bubbles level lay it on the wall B and get an assistant to make a mark on the wall where

the zero line cuts it. Unless the director being used is in adjustment, there will now be two chalk marks on the wall B. Make a third mark halfway between the first two. The line from the mark on the post A to the centre mark on the wall B will be a horizontal plane.

9. Tell the squad that any director can now be tested against this horizontal plane by placing it on one end of the horizontal plane and measuring the angle of sight to the other. The angle of sight measured is the amount of error in that director.

10. Practise the squad in setting up a horizontal plane and testing directors and question the squad in making allowance for the errors when measuring angles of sight.

Method 2

11. State that, on active service, directors can be checked for angle of sight using a dial sight that is known to be in adjustment.

12. Demonstrate that the angle of sight to any distant object is measured with the dial sight. The director is then set up with the object glass level with the dial sight and the angle of sight to the object measured.

If the reading is the same as the reading on the angle of sight drum, the director is in adjustment. If not, the amount of error should be noted.

13. Practise the squad.

Adjustment

14. Tell the squad that all adjustments must be carried out by an armourer.

Conclusion

15. Questions from the squad.

16. Sum up main points.

APPENDIX 1

BLANK FIRING ATTACHMENT

Fitting of the attachment

1. The following are the components of the blank firing attachment:—

Barrel, Mark 2, drill purposes, blank.
Cone, front, muzzle attachment, blank.
Nut, adjusting, muzzle attachment blank.
Screw, adjusting, muzzle attachment, blank.
Spanner, muzzle attachment, blank.

2. The barrel is specially choked at the breech and is marked " DPB " on the trunnion block. The adjusting screw is screwed into the front cone from the rear, so that its large end may engage in the muzzle cup. The front cone with the adjusting screw assembles into the outer casing of the muzzle attachment in place of the existing front cone. The adjusting nut screws on to the projecting end of the adjusting screw and locks against the face of the front cone. The spanner is suitably arranged for the muzzle cap, adjusting screw and nut.

Adjustment of the gun

3. The weight of the recoiling portions should not exceed 2 lb. The weight of the fusee spring should be about 4½ lb.

The adjusting screw of the muzzle attachment should first be screwed inwards to the muzzle cup until it just begins to force the recoiling portions backwards. It should then be screwed 1¼ turns and secured in position by the nut. The screw may require further adjustment in order to obtain correct functioning, but in no case should the screw be less than 1 turn back from the muzzle cup. Adjustment should be made in ¼ turns.

Firing

4. Service guns will be used for firing. A belt, preferably as regards size of pockets part worn, should be employed. The blank ammunition should be inserted crimped and flush with the front edge of the belt, in groups of 10 rounds. This number is sufficient for the purpose of representing machine gun fire and also ensures a longer life of choke in the barrel. The barrel casing will be filled as for ball ammunition. When firing becomes noticeably irregular, the barrel will be set aside for examination by an armourer.

Cleaning

5. On completion of blank firing, the guns will be immediately restored to their normal condition for firing ball ammunition. The gun will be cleaned in the normal way, (*ie*, as if ball ammunition had been used) except that no attempt will be made to clean the inside of the barrel forward of the choke.

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